



CHEETAL

JOURNAL OF

The Wildlife Preservation Society of India

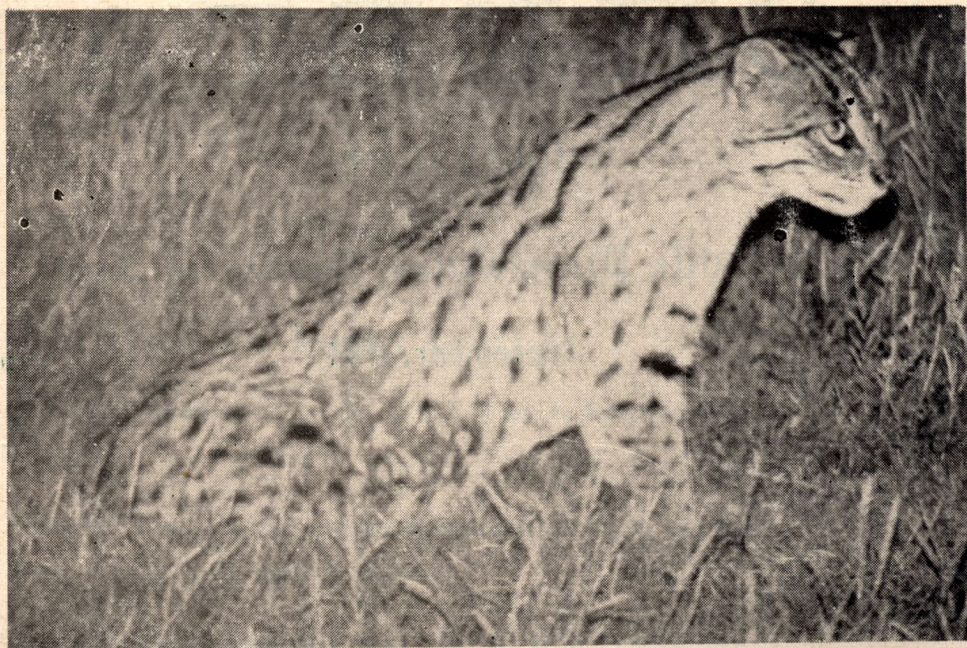
Vol. 26

September, 1984

No. 1

Painted Storks





Fishing cat (*Felis viverrina*)



Jungle cat (*Felis chaus*)

(See article on Page 5)

CONTENTS

1. Ourselves	...	...	3
2. Vanishing Cats of Rajasthan	...	...	5
3. <i>Lantana camara</i> on Wildlife Habitats with special reference to the Melaghat Tiger Reserve by V.B. Sawarkar	...	...	24
4. Conservation of Nature and Problems of the Collectors and Sub- Divisional Officers by Dr. M.K. Ranjitsinh, I.A.S.	...	...	39
5. Mammals of Garhwal Region by B.S. Lamba, P.C. Tak and Girish Kumar	...	...	45
6. Illicit Trade in Wildlife by R.K. Thakur	...	...	49
7. All India Jeeva Raksha Bishnoi Sabha by Air Cmde. R.S. Bishnoi, A.V.S.M. (Rtd.)			56

*A tree is known by the fruit it bears;
A forest is known by the animals it rears.*

Come and see it for yourself

Visit:

PALAMAU NATIONAL PARK
&
HAZARIBAGH NATIONAL PARK

IN
BIHAR

For details please Contact:—

- 1. Divisional Forest Officer,**
Daltonganj South Division,
At & P.O. Daltonganj,
Dist. Palamau (Bihar).
 - 2. Divisional Forest Officer,**
Hazaribagh West Division,
At & P.O. Hazaribagh,
(Bihar)
-

CHEETAL

Journal of the Wildlife Preservation Society of India

Vol. XXVI

}

September, 1984

}

No. 1

Ourselves

The Wildlife Preservation Society of India, Dehra Dun has been rendering yeoman service in the cause of Wildlife Preservation, Conservation and Management in the country for the last 25 years.

In view of the fact that Government and non-Government organisations need technical assistance in promoting their programmes and the availability of technical expertise with its members, the Society has recently established a Consultancy Division. The Division is equipped for framing schemes for research and development in matters connected with conservation of Wildlife (Fauna and Flora) and maintenance of the environment. These have become so important for the sustenance of the life systems in the situation created by wreckless exploitation of natural resources for meeting the needs of the fast increasing population. The Division has also the capability of executing connected schemes through experienced and qualified personnel.

The Society can, through this Division, frame and execute schemes on:—

1. Studies of existing position of Wildlife (Fauna and Flora) and natural resources of selected area.
2. Development of Biosphere Reserves, National Parks, Sanctuaries and Nature Reserves.
3. Development of Urban Parks and Gardens.
4. Development of Zoological Parks and Gardens, Animal Parks, Safari Parks, Nature Parks and Amusement Parks.

5. Legal and other measures necessary for the maintenance of the environment and reserved areas.
6. Interaction between man and other natural resources.
7. Afforestation including social forestry. Wildlife education including establishment of institutional syllabus and courses.
8. Social Conservation measures.
9. Fish and Fisheries development.
10. Ornithological studies.
11. Wildlife tourism, photography etc.
12. Generally, any matter for the improvement and maintenance of the environment.

The Society will draw experts and consultants from amongst its members and also from others from time to time. Basically the experts would be Indians but when need arises foreign experts would also be engaged to ensure the quality of work.

The Chief Consultant of the Society is Shri N.D. Bachkhedi, IFS (Retd.), ex-Inspector General of Forests. He has a varied experience of managing forests including Wildlife, development of Sanctuaries and National Parks, designing and establishing Zoological Parks, exploring for rare Fauna (including the controversial abominable snowman) and organising Wildlife Societies. He has agreed to guide the work of the Consultancy Division, on honorary basis. A panel of other experts has also been drawn up. These are people of tried ability in the field of Wildlife conservation and management, environment and other natural sciences e.g. Zoology, Botany, Geology, etc.

The Society proposes to work on the basis of actuals and a nominal charge for administrative expenses.

Vanishing Cats of Rajasthan

KAILASH SANKHALA & V.D. SHARMA

Summary

The present study of the ecological status of the lesser cats of Rajasthan is a rapid survey. It gives broad indications of the position of fishing cats, caracals, desert cats and jungle cats. Less than ten fishing cats have been reported from Bharatpur. This is the only locality where fishing cats have been seen. Caracals are known to occur locally in Sariska in Alwar, Ranthambore in Sawaimadhopur, Pali and Doongargarh in Bikaner district. Their number is estimated to be less than fifty. Desert cats are thinly distributed over entire desert range receiving less than 60 cm rainfall. Their number may not be more than 500. Jungle cats are still found all over the State except in extremely arid zone receiving less than 20 cm of rainfall. An intelligent estimate places their population around 2000. The study reveals that the Indian hunting cheetah did not exist in Rajasthan even during the last century when ecological conditions were more favourable than they are even today in Africa. The cats are at the apex of biological pyramid of the ecosystem. Their role specially in controlling the population of rodent pests is significant. Strict protection, wide publicity of the cats has been suggested. Observations have been supported by photo documentation of the cats in their environments.

The photographs of desert cat and fishing cats have been taken for the first time.

Introduction

Lesser cats are becoming lesser and lesser all over their habitat in the Indian sub-continent. But their depredation is alarming in the arid lands of Rajasthan. The critical and harsh climatic conditions, vulnerable openness of the woodland and scrubland, surging of a roaring trade in cat skins, vastness as well as location of the State on the Indo-Pak border, highly susceptible to international smuggling, had been the main factors responsible for their destruction during the last two decades, specially after (1968) enforcing a total ban on export of leopard and tiger skins. Our ignorance, and our apathy towards them, the desert cat was not classed as protected species in the Wildlife Protection Act 1972, and the jungle cat did not figure anywhere in the laws are unpardonable acts of irresponsibility. Much has already been lost. Still the remaining of the lesser cats can be saved.

Habitat

The Indian Thar Desert is almost equally divided between the Sind and Bhawalpur districts of Pakistan on the western side and the western Rajasthan on the eastern side. The latter constitutes about 2,30,000 hectare comprising of wind-blown sands, fixed and shifting

sand dunes, inter sand-dunal areas and rocky outcrops. The last forms only 7-8% of the area. The climate of the region is characterised by extremes of temperature ranging from 48.9°C (Shri Ganganagar) in May to -2.7°C (Churu) in January. Cold winds during winter increase the chill-factor at night and the hot winds (Loos) during summer days increase desiccating effects. They also create sand storms which reduce the light intensity. Rainfall at places is lower than 100 mm and that too is erratic. Though clouds may over cast the sky for over 20 days but rainy days are less than 100—all any time in July and August. The region is drained by the Luni and its tributaries into the Runn of Kutch. Most of the sandy region has closed drainage and form shallow saline inland lakes. On drying, these lakes form flat saline plains.

The sandy tract supports *Phog* (*Calligonum polygonoides*), *Kair* (*Capparis decidua*), *Kheenp* (*Leptadenia pyrotechnica*), *Tephrosia falciformis*, *aak* (*Calotropis procera*), *bui* (*Aerva tomentosa*), *A. pseudotomentosa*; extensive growth of *sewan* grass (*Lasiurus sindicus*) is conspicuous. Scattered trees of *jal* (*Salvadora persica*) and *Khejri* (*Prosopis cineraria*) and *ber* (*Zizyphus nummularia*), scattered trees and shrubs of *gugal* (*Commiphora mukul*), *kumath* (*Acacia senegal*), *kair* (*Capparis decidua*), *thor* (*Euphorbia caducifolia*) occur in the hilly outcrops.

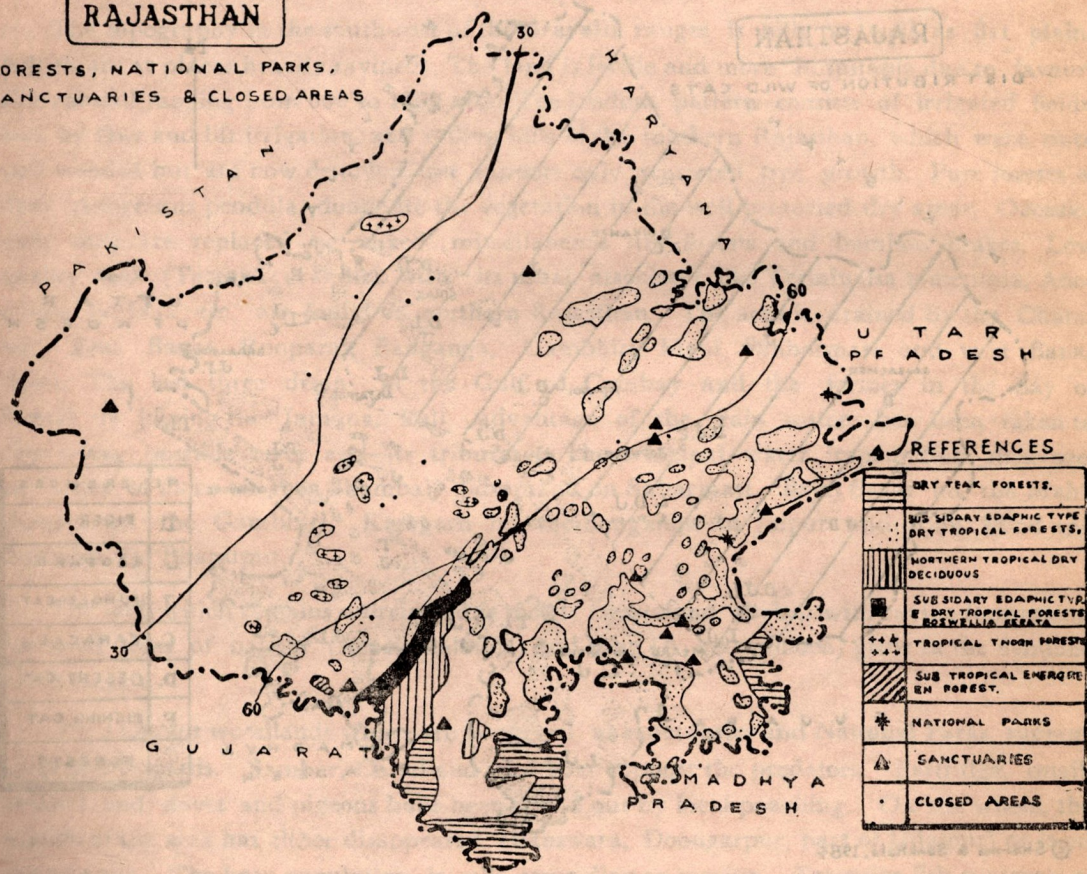
Only woodland is the Aravalli range from Mount Abu to Khetri and Alwar through Sikar. Jaipur districts. *Dhok* (*Anogeissus pendula*), *salar* (*Boswellia serrata*), *godal* (*Lanea coromandelica*) form the principal tree growth on the hills and *ber* and *dhak* (*Butea monosperma*) and *roni* (*Acacia leucophloea*) and *babul* (*Acacia nilotica*) grow in the valley bottoms and flat lands.

Map I shows the distribution of forests, forest types, National Parks Sanctuaries and closed areas in the State of Rajasthan.

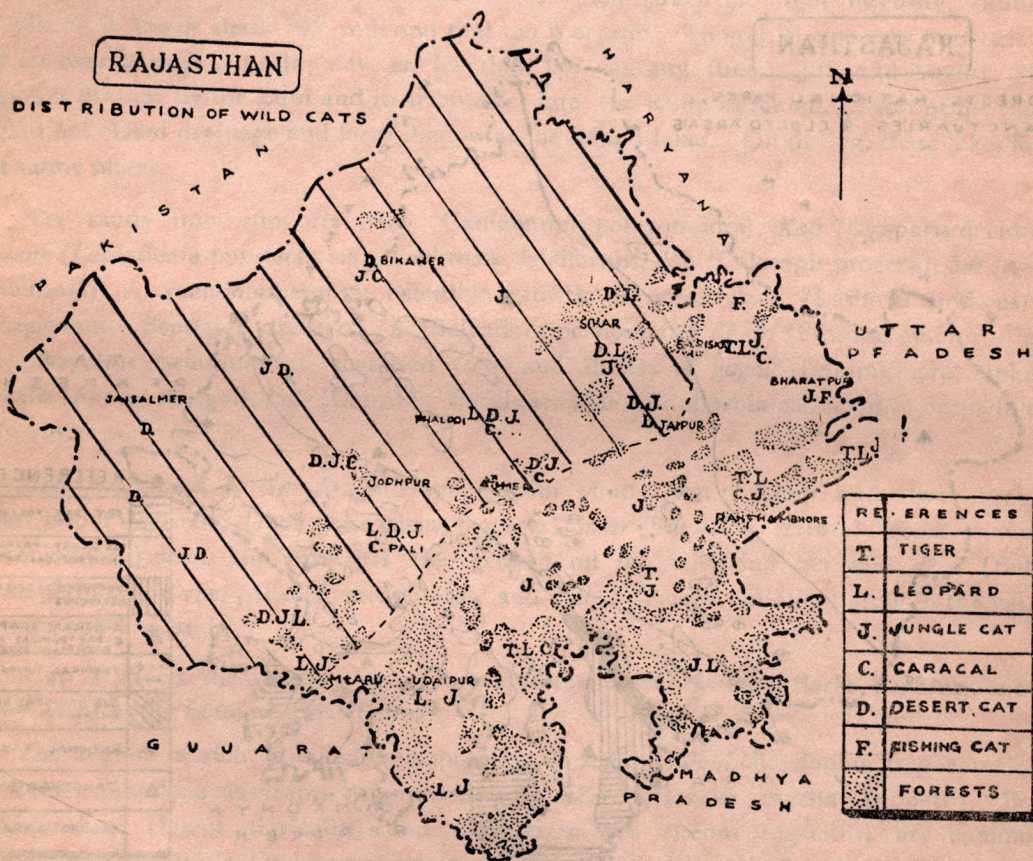
The region is rich in antelope population, especially *nilgai* (*Boselaphus tragocamelus*), black buck (*Antelope cervicapra rajputana*) and *chinkara* (*Gazella gazella, bennetti*). Both common hare (*Lepus nigricollis*) and the *desert hare* (*Lepus nigricollis*) are common. Colonies of both *gerbils* (*Gerbillus gleadowi* and *G. nanusindus*) are found in sandy plains interspersed with dunes. *Rattus gleadowi* is found in gravelly patches in sandy areas. Population of grey partridge (*Francolinus pondicerianus*), quail (*Turnix suscitator*), Peafowl (*Pavo cristatus*), sand grouse (*Pterocles exustus*), ring dove (*Streptopelia decaocto*), pigeon (*Columba livia*), sparrow (*Passer domesticus*) is conspicuous. The region is the last home of the Great Indian Bustard (*Choriotis nigriceps*) and wintering region of the Imperial sandgrouse (*Pterocles orientalis*) and Hubara bustard (*Chamydotis undulata*). Colonies of spinytail lizard (*Uromastix hardwickii*) are found throughout the desert region in low lying areas having hard clay of Calcareous strata. Indian sand-fish (*Ohiomorus tridactylus*),

RAJASTHAN

FORESTS, NATIONAL PARKS,
SANCTUARIES & CLOSED AREAS



Map I



© Sharma & Santhala, 1984

Map II

Indian fringe-toed sand lizard (*Acanthodactylus c.cantoris*), sand boa (*Eryz johnii*), sand geckos (*Stenodactylus orientalis*) inhabit the area. Immediately after the rains, population of insects, specially the dung beetles, explodes. They actively carry the organic biomass to lower strata of the desert soil and return the manure to enrich the desert soil. In turn they serve as staple food for reptiles, birds, foxes and cats.

The topography in the south-east of the Aravalli ranges is hilly as well as flat plains (which are at places heavily ravined). The land is fertile and more hospitable due to favourable rainfall ranging from 600 to 1100 mm. The landuse pattern consists of irrigated fields, both by flow and lift irrigation, and rolling hills of the southern Rajasthan, which were once well wooded but are now denuded and support only scattered tree growth. Pure forests of dhak (*Anogeissus pendula*) dominate the vegetation in the well protected dry areas. Occasionally, they are replaced by mixed miscellaneous dry forests and bamboo brakes. Low quality teak (*Tectona grandis*) with its usual associates like *Terminalsa tomentosa*, *Anogeissus latifolia* etc. are found in southern Rajasthan. The area is drained by the Chambal, East Banas, Rooparal, Banganga, Gambhiri, Mahi, Sabarmati and west Banas rivers. The last three drain in the Gulf of Cambay and the former in the Bay of Bengal by joining the Jamuna. Full advantage of the rain water has been taken to dam every possible river and its tributary. The principal water impounding structures are series of dams on the Chambal, Jaisamand on Sabarmati, Bajaj Sagar on the Mahi, Baretha on the Gambhiri, Ramgarh on the Banganga in Jaipur and Ajan Bund and Keoladeo in Bharatpur.

The land which remains unirrigated is mostly wasteland broken with ravine formations. Scattered trees of babool (*Acacia nilotica*) and rong (*A. leucophloea*) grow in the denuded sandy tract.

The remnant woodlands which are preserved as sanctuaries and National Parks support tigers and leopards. Sambar, Chital and wild boar support the predators. Partridge, quail, peafowl and doves and pigeons have been wiped out by local poaching. On the whole, the wildlife of the area has either disappeared (Banswara, Doongarpur, part of Udaipur) or is on the way out. The hare population is still struggling to survive. Extensive fish contracts of the dams compete with the fish eating predators.

Vanishing Cats

Authors have taken an ecological stock checking of the Indian desert cat (*Felis silvestris ornata*), jungle cat (*Felis chaus*), fishing cat (*Felis viverrina*), caracal (*Felis carcal*) and made investigations into the existence of hunting cheetah (*Acinonyx jubatus*) in Rajasthan. The princely State of Jaipur was once known for training hunting cheetah for sport. Although

data has been collected about the status of the common leopard (*Panthera pardus*) and the Indian tiger (*Panthera tigris*), but the same has been withheld in order to highlight the situation of the lesser cats.

The data presented here is from the dated observations made by the authors during the course of their tours, both at night and during day throughout the State in last two decades. The data was collected more systematically during the last five years. Intensive hunt for the information was made after the first informal meeting of the Cat Group of the IUCN held on November 23, 1983 at New Delhi. Authors' personal encounters have been few and therefore, there is dearth of direct information. But interviews with professional hunters, jogies, kalbelias, moghias, shikaries and 'sportsmen' have yielded dependable information. In surprise raids conducted by the Flying Squads of the Wildlife staff of Rajasthan, Fresh raw skins of desert cats, jungle cats and caracal were recovered. These skins were collected by the professional hunters, not far from the places of seizures. This also serves as direct evidence of the presence of the species in the locality. Meetings with aggrieved parties whose poultry had been attacked by jungle cats and who have encountered the predators have also been considered direct information. The valuable piece of information about non-existence of the hunting cheetah in Jaipur State has been discovered from Chuttan Khan, Chotte Khan, both claiming to be young lads of the Cheetah Training School of Jaipur at the end of the last century. Authentic breeding record of Jaipur zoo strongly supplement the stray field observations of the hunters and the authors.

Observations

Personal observations of the authors :

Recovery of Skins of Desert Cats

1. Jaisalmer	Dec. 1980	Extreme desert region.	23 skins of desert cats	Photo-
			recovered in a surprise raid conducted by the desert National Park protection staff.	graph of skins taken.
2. Pali	Feb. 19, 1980	Desert region of sandy plains and rocky out-crops of Eranpura granite a part of the Aravallis.	Surprise raid conducted on trader's godown 5102 ray skins recovered. They included three skins of desert cat, none of jungle cat, five of caracal, one of wolf, 128 of jackal and rest all of monitor lizard.	Photo-graph reproduced.
3. Phalodi, North of Jodhpur District.	Nov.-Dec., 1983	Open flat land with fixed and mobile sand dunes.	Out of 1500 skins seized, by Customs Deptt., Govt. of India, there were 224 of jungle cats and 107 of desert cats.	Photo-graph taken

Sl. No.	Name of locality	Date & time	Habitat type	Activity	Observer	Remark
1.	Gadra Road: near Barmer	Dec. 1975; 6 P.M.	Fixed sand dunes vegetated by phog, seven; Common fox also sighted about 600 metres away.	Looking for gerbills in bushes.	Sankhala	
2.	Mukam: adjoining Nagaur and Bikaner districts	Feb. 1979; 7 A.M.	Fixed sand dunes; vegetation phog, kumat; Rich population of doves, pigeons, partridges, peafowls and gerbills. Population of chinkara is rich. A pack of wolves and a few common foxes and desert foxes also seen. The area is strictly protected by Bishnois as this is the place where Jameswarji meditated, preached for years. Finally he rests in peace here.	Basking in winter morning sun, a metre above its burrow.	Sankhala	Photograph taken
3.	Near Doongargarh on N.H.W. 11	2-1-1979 9 P.M.	Sand dunes; Phog and Arua tomentosa; Rich population of gerbills and sanda.	Cought in the headlights of the car on road.	Sankhala	
4.	Sudasari, Jaisalmer	Nov. 1982 7.30 A.M.	Closed area. Open grassland (sewan), loosely packed sand overlaid on Mogra laid; Kair is common tree. Rich population of gerbills. A desert fox has also sighted.	Searching for prey.	Sankhala	
5.	Kukas, Jaipur	Dec. 1983	Bank of a dry sand stream with Tephrosia falciformis and Zizyphus nummularia. Area rich in gerbill and lizard population	Sitting in early morning sun.	Sharma	Photograph taken

Sl. No.	Name of locality	Date & time	Habitat type	Activity	Observer	Remark
			Hare, porcupine, jackal and hyaena and jungle cat also present in the area.			
6.	Chhoti Bagru	Dec. 1983	Stabilised sand dune with scattered clumps of Saccarum munja grass. Area again rich in gerbill population and birds like partridges and sparrows.	Sitting by side of a moonj clump.	Sharma	Photograph taken
7.	Chhoti Bagru	Jan. 1984	—do—	Pug marks of 3 kittens and mother seen.	Sharma	—do—

Interviews

Name of the person Interviewed	Area of Operation	Information given	Interview By	Remark
Sri Bhanwari Nath (40 years), Sapera, Jaipur	Jaipur, Nagaur, Bikaner.	He killed many* desert cats which he calls Chhoti Billi, in the desert region of the districts. According to him, the cat lives in sandy area only and never enters habitation. Price of the desert cat skin is about four rupees per piece.	Sharma	*Not willing to admit the number killed by him.
Sri Sultan Nath S/o. Chiman Nath (51 years) Kalbelia	Doongargarh of Bikaner district and Sikar district.	He informed of killing of desert cats, caracal and jungle cats. He also saw four kittens of desert cat in Doongargarh, sometime near (in October) Dewali price for one skin is Rs. 5/- per piece.	Sharma	

Name of the person Interviewed	Area of Operation	Information given	Interview By	Remark
Sri Gulam Nath (60 years) Jogi of Diggi Malpura	Bikaner district; Jaipur district.	He had killed innumerable desert cats. He had seen kitten of desert cat in March-April. Price of skin depends on size. It generally ranges from Rs. 4 to 5 per skin.	Sharma	
Sri Srawan Nath (36 years)	Nagaur, Sikar and Jaipur.	Reports seeing of four kittens of desert cat in December of about 11/2 months old in S. munja clump. He also saw vomiting of food by the mother inside the burrow to feed its kittens. The desert cats digs its own burrow. In rocky area, the cat lives in clumps of Euphorbia or under rocks. Its choice of habitat is sandy area. He saw a camalion only half eaten by a desert cat.	Sharma	

II—Jungle Cat

Sl. No.	Name of Locality	Date & time	Habitat type	Activity	Observer	Remarks
1.	Sariska-Kalighati	Dec. 1970; 9.30 p.m.	Well wooded forests of Sariska Sanctuary in the outer Aravallis. Rich population of peafowl, partridge, hare.	Regularly came to drink water and also to feed on the left over of the tiger's kill; preying on rats, partridges, peafowl.	Sankhala	Photograph
2.	On the Plateau of Ranthambhor near Bagola	June, 1971	Open forest—Anogeissus pendula.	Preying on field rats.	Sankhala	Photograph

Sl. No.	Name of Locality	Date & time	Habitat type	Activity	Observer	Remarks
3.	Anatpura	May, 1974	A grass patch in front of forest house.	Preying on field rats and came to drink water.	Sankhala	Photograph
4.	Anatpura	May 1976; 11 a.m.	A grass patch in front of forest house.	A jungle cat arrived during hot day to drink water.	Sankhala	Photograph
5.	Slopka, Sariska	March, 1970	Well wooded forests of Sariska Sanctuary.	Sitting tom.	Sankhala	Photograph
6.	Kalighati water hole	Dec. 1983	—do—	Mother and one kitten seen sitting near road.	Sankhala	Photograph
7.	Kalighati	Jan. 1984	Well wooded forests of Sariska Sanctuary.	—do—	Sankhala and Sharma	Photograph
8.	Near culvert on way to Kalighati	March, 1914; 2 p.m.	Well wooded forests of Sariska Sanctuary.	Jungle cat sighted crossing the road.	Sankhala	This was regularly seen near the road.
9.	Ranthambhor	Nov. 1983	Wooded forests of Ranthambhor Tiger Reserve	Stalking for prey (partridge).	Sharma	
10.	Kamolder old cremation ground on Lakarda Road.	Dec. 1983	—do—	Walking on jeep trail.	Sharma	
11.	Tar road near Singhdwar	Jan. 1984	Wooded area.	Seen sn night drive; caught in headlight.	Sharma	

Sl. No.	Name of Locality	Date & time	Habitat type	Activity	Observer	Remark
12.	Khanupura Keoladeo National Park	Jan. 1984	Thick grass (Khas grass) area.	Large jungle cat sighted while it briskly crossed the road.	Sankhala	
13.	Dudu in Jaipur District	Nov. 1983	Open broken ravinous area, rich population of hare, field rats, partridges and doves and lizards.	Two jungle cats sighted. They were fighting with paws.	Sharma	Photo-graph taken.
14.	Jaipur-Ajmer Road near Bhakrota village on NHW 8	Dec. 1983	Open land with agricultural fields.	Jungle cat fun-over by a fast heavy vehicle.	Sharma	—do—
15.	Kukas, Jaipur	Jan. 1984 night drive.	Hilly area with denuded hills—Euphorbia clumps. In the valley fixed sand. Rich population of gerbills, hare, partridge and doves.	Caught up in the headlight of the jeep.	Sharma	—do—
16.	Kukas, near Jaipur	March, 1984	In the wheat fields under harvested hay stocks of wheat.	Searching for prey.	Sharma	

Other Evidences

1.	Chhoti Bagru, Jaipur District	Nov./Dec., 1983	Fixed sandy area with Munj as cover.	Footprints seen.	Sharma	Photo-graph
2.	Kukas	March, 1984	Hilly area, sandy Wasteland included between to hills. Rich population of gerbills.	Jungle cat entered its burrow. Footprints of 3-4 jungle cats seen in the same area.	Sharma	—do—

Sl. No.	Name of locality	Date & time	Habitat type	Activity	Observer	Remarks
Skins Recovered						
3.	Pali	—		Nine skins of Jungle cats recovered.	Sharma	Photograph
4.	Phalodi			224 skins of jungle cats recovered.	Sharma	—do—
5.	Abu Road Sirohi	1977	Wooded hills, over grasslands with bushes rich population of partridges, hare.	24552 skins of Jungle cats reported by a trader in his return to Chief Wild Life Warden.	—	Case Registered

Name	Area of operation	Information given	Interviewer	Remarks
Interviews				
Sri Bhanwari Nath (40)	Ajmer, Nagaur, Jaipur.	He killed many jungle cats for sale of skins at Rs. 6 each. Kitten observed by him (i) Nov.-Dec., and (ii) June-July.	Sharma	
Sri Sultan Nath (51)	Bikaner, Sikar Jaipur.	According to him jungle cats are found in Nahargarh degraded forests of Jaipur.	Sharma	
Sri Gulam Nath (60)	Diggi Malpura in Jaipur district, Bikaner and Nagaur districts.	Jungle cats enter in villages. They stay in wheat stacks to prey on birds and field rats.	Sharma	
Sri Jaswant Singh Nathawat, Wildlife Warden, Kumbhalgarh	Kumbhalgarh, Udaipur and Pali districts.	Presence of jungle cats on the fringes of forests of the Sanctuary.	Sharma	

Name	Area of operation	Information given	Interviewer	Remarks
Sri Panney Singh, Dy. Chief Wild Life Warden	Udaipur, Sirohi Chittorgarh	Reports sighting of jungle cat in Jaisamand, Bhensrodgarh and Darrah Sanctuary.	Sharma	
Sri Roop Singh, Wildlife Ranger	Mount Abu	Reports presence of jungle cat in Mount Abu in higher ridges as well as foothills.	Sharma	
Sri Bhanwar Singh, Asstt. Forester, Kalighati, Sariska	Kalighati, Sariska.	Reports about four kittens of two month old, playing every day with their mother in winter sun in Dec. 1983. Also going to waterhole to drink during day as well as night.	Sharma	
Sri Angadlal, Forester, Doli Jodhpur	Doli, Jodhpur and Dhawa of Barmer district.	Reports raiding poultry in his hut. Also informs of the cat feeding on sands.	Sharma	

Sl. No.	locality	Date & Time	Habitat type	Activity	Observer	Remarks
---------	----------	-------------	--------------	----------	----------	---------

III-Fishing Cat

1.	Sitaram Baba ki Diggi; Keoladeo National Park	May, 1983; Evening	Wooded wetland.	Entering into a Capparis bush.	Sharma	
2.	Mallah	Mid July, 1980	Large pool of deep water; thickly grown Acacia trees.	Fishing on cat- fish, more than 1 kg.	Bholu Khan	
3.	Mallah	End of July, 1980	On bank.	Sitting on a tree.	„	
4.	Mallah	April, 1980	Deep water pool bank over green Acacia tree embank- ment covered with Hins and Jal bushes.	Playing with a kitten.	„	
5.	Kadam Kunj	Sept., 1982	Hins and Jal bush.	Catching frogs, toad.	„	

Sl. No.	Locality	Date & Time	Habitat type	Activity	Observer	Remarks
6.	Kadam Kunj		Thick overgrowth of trees; extensive water surface.	Two adult cats fighting.	Bholu Khan	According to Bholu Khan cats are not shy of torch light or jeep headlights. They boldly walk towards the source of light.
7.	Selised	1977	Large irrigation reservoir and fish breeding centre of Fisheries Deptt.	Sighted at night.	Roop Singh	Observation : The fishing cat preys on splashed fish. It also jumps into water to catch fish. Sightings are more during April and July.

Note : Not a single skin of a fishing cat was recovered in any of the raids from skin traders.

IV—Caracal :

1.	Ajabgarh	Dec., 1956 Sunset	Woodland of Sariska Sanctuary, Alwar district. <i>Anogeissus pendula</i> on edge of forest road; partridge, peacock, hare.	Stopped and snarled at the observer. Tufts of ear erect.	Sankhala	
2.	Tamba Kan	Dec., 1956	Open scrub land; scattered Khair trees, partridge, peacock and hare.	Two kittens captured; they were of not more than 6-7 days.	Rajendra Nath	Cubs died. Skin identified by Z.S.I., Calcutta.
3.	Ajabgarh	May, 1962	Valley area overgrown with trees and heavy undergrowth of Grewia.	2 kittens 2-3 days old collected from hollow of a tree.	Kishan Roongta, Jaipur.	Cubs reared. They lived for 15 years in captivity.
4.	Tamba Kan, Sariska	3rd week	Grassy scrub land with scattered Khair and Dhok trees; partridge, peacock and hare.	Relaxing in grass.	Sankhala	

DISCUSSIONS

The lesser cats were neither trophies nor posed any threat to man and therefore, they never attracted any attention in the past. Only sketchy information about their existence and behaviour is available. First concern for the desert region was made only in 1952 with the establishment of the Desert Afforestation Centre, Jodhpur. This was more of a programme of raising roadside plantations and patchy demonstration plots of afforestation and grassland improvement. It was only after the establishment of the Arid zone Research Institute, Jodhpur that wild animals of the desert region attracted some attention. Still in the formative years, the concern was for rodents and their control. The wildlife of the region was still unimportant subject. The lesser cats like the desert cat, caracal, and jungle cat, though effective rodent controllers were still ignored.

There are only a few references to indicate existence of these cats. Sen & Sankhala (1957) described distribution of desert cat in areas having rainfall less than 60 cms. According to them the jungle cat is not found in the desert region where rainfall is less than 30 cms. They also refer to occurrence of caracal in the forests of Ajabgarh and Sariska. According to Prakash (1975) the desert cat is distributed in the sandy tract as well as the central Thar. He has made no mention of occurrence of the desert cat as well as the jungle cat in the rocky outcrops and hills of the desert. He has also not reported the presence of jungle cat in the extreme arid regions of Rajasthan, and made no mention of the existence of caracal in the desert region, except that a Jogi told him of killing a caracal near Bikaner (Prakash 1961). According to Tikedar (1983) jungle cat is found throughout the desert region and the desert cat throughout the state of Rajasthan including the forested region having over 60 cms. rainfall. He gives the distribution of caracal throughout Rajasthan in a general statement. Sen & Sankhala (1959), Prakash (1975) and Tikedar (1983) do not report of existence of the fishing cat in Rajasthan. Fishing cat has been reported in Keoladeo Bird Sanctuary, now a National park, by Saxena (1975). He has also reported occurrence of the leopard cat in the sanctuary. This has not been confirmed by sighting or other evidences.

Distribution of lesser cats based on the information collected for this study has been shown in the attached map of Rajasthan.

DESERT CAT

During the present study, evidences of existence of the desert cat have been collected by direct observations from Gadra Road Barmer, Sudasiri Jaisalmer, Mukam and Doongargarh Bikaner, and Chhoti bagru and Kukas Jaipur. Skins of desert cats have been seized from Jaisalmer, Phalodi and Pali townships. Interviews with four professional hun-

ters Bhanwari Nath (40), Sultan Nath (51), Gulam Nath (60) and Sarwan Nath (36) revealed that they regularly killed desert cats in Bikaner, Doongargarh—Bikaner, Nagaur, Sikar Bir—Sikar, and Jaipur for trade. These evidences establish range of distribution of the desert cat from Jaipur to Jaisalmer and from Pali to Bikaner. It lives mostly in sandy areas where it makes its own burrow. It also inhabits rocky areas where it lives under rock or in Euphorbia clumps. The desert cat has not been reported from the forested region and the areas receiving over 60 cm of rainfall. The desert cat feeds on gerbills, lizards and birds. The cat breeds in March-April and also in November-December. Three to four kittens have been reported with mother. It regurgitates food for the kittens. It lives in association with jungle cat and desert fox without conflict.

Comparative population of this cat in western Thar desert is indicated by the ratio of desert cat skins in the bag of pelt traders. The ratio of desert cat skin to jungle cat skin in Phalodi area is 1:2 whereas it is 1:3 to 1:4 in areas of Pali district.

JUNGLE CAT

The jungle cat has been frequently sighted in Sariska (Sankhala, Sharma, Bhanwar Singh), Keoldeo Bharatpur (Sankhala, Sharma) Ranthambhor, Sawai Madhopur (Fateh Singh), Kukas (Sharma), Chhoti Bagru (Sharma) and Dudu (Sharma) in Jaipur district. The cat has been seen in Dhawa (Angad Lal) in Jodhpur district. Skins of freshly killed jungle cats have been seized at Pali (9), Phalodi (224) and Tonk. Interviews of Banwari Nath, Gulam Nath, Sultan Nath, professional hunters reveal occurrence of jungle cats in Diggi Malpura, Nahargarh in Jaipur. Reports received from wildlife staff of Rajasthan establish of the presence of jungle cat in Shahbad and Darrah in Kota District, Ramgarh in Bundi district, Bhensrodgorh in Chittorgarh and Jaisamand in Udaipur district.

From the above evidences it appears that the jungle cat is widely distributed all over the State including the arid lands of Phalodi and Dawa of Jodhpur district where it lives in association with the Indian Desert cat and the common fox. However, it has not been recorded in the extremely arid lands of western Barmer and Jaisalmer districts where rainfall is less than 20 cm.

It hunts small mammals, field rats, mice, peafowl, partridges and lizards including spiny-tail lizards. It attacks poultry in villages. Its bold aggressive behaviour is recorded in the historic incident that occurred in the camp of Rana Pratap when he was dislodged from power and was hiding in hills of Mewar (Tod 1829). A jungle cat attacked his daughter and carried away the only piece of bread that the starving child was holding. The situation made the valiant Rana desperate to sign an instrument of unconditional surrender. It also feeds on the left overs of the tigers.

The cat breeds well; 3-4 kittens have been recorded in Sariska. They are playful and the mother takes full care in training them.

FISHING CAT

Prater (1965), Tikedar (1983) have not recorded fishing cat in Rajasthan. The evidence of presence of fishing cat is limited to only one locality Keoladeo National Park, Bharatpur (Sharma). The only person who has successfully photographed the cat in its habitat is Bholu Khan. According to him, there are more than a dozen cats in the wetland and are distributed in different localities; Baba Sitaram Ki Diggi, Mallah crossing, Sapan Mori, Keoladeo and Kadam Kunjh. According to Prater (1965) the cat does not enter water in pursuit of its prey. Our information (personal communication and Bholukhan) is and that the cat climbs trees and plunges in water from a vantage point to catch fish. The cat has been observed feeding on a large catfish weighing about one kg. It was also observed feeding on splashed fish and on toads and frogs. The cat is largely nocturnal. The fishing cat is breeding well in the National Park. A cat and a kitten was observed in Keoladeo National Park. Jaisamand, Pichola in Udaipur, Band Baretha in Bharatpur, Selised dam in Alwar district, Sardar Samand in Pali district are some of the potential areas where the cat could be found. This needs a thorough search. Skins of fishing cats have not been recovered from any of the skin traders.

CARACAL

Prater clearly mentions its existence in drier parts of Rajputana now Rajasthan. Confirmed reports of its occurrence have been received from Ranthambhor (Fateh Singh), Sariska (Sankhala, Kishan Roongta, Sharma) and Pali (ACF Pali) areas only. The interview information of Sultan Kalbelia and Gulam Nath (60), who have killed over 20 caracals in Sikar Bir, Sikar District (Sikar Bir is now released for industrial development), Daggi Malpura, Jaipur and Doongargarh sandy area in last few years, is reliable. Even today the region of Doongargarh supports a rich population of hare and partridges (Peter Jackson's letter to Srimati Indira Gandhi dated 10, Feb., 1983). There is a possibility of its occurrence in this area.

The evidence of caracal trainers and records of Shikar Khana of Jaipur State establish that caracal, were present in Kukas and other adjoining forests of Jaipur. Since the evidence is nearly 50 years old and there has been no sighting recently, the information is only of historic significance. Presence of caracal in Kukas could not be confirmed even after repeated efforts.

The caracal is, therefore, one of the rarest of all the lesser cats of Rajasthan localised to only few sites viz. Sariska, Ranthambhor, Pali, Ajmer and Doongargarh.

The caracal is an excellent predator which can even outwit the shikaries. It feeds on hare partridges and peafowl. Kitten of 6 to 7 days old have been recorded in December as well as 2-3 days old in May, from hollow of a tree in Ajabgarh Sariska. The captive caracals caught from Ajabgarh lived for 15 years.

HUNTING CHEETAH

Existence of cheetah in wild in Rajasthan at any stage is doubtful even during the grand period of Shikar of Maharaja Ram Singh, 1835-1880. That was the time when human population was low, extensive waste lands were teeming with black buck and chinkara. The autocratic rule of the Maharaja gave rigid protection to all forms of wildlife. There could be no better period for the existence of the hunting cheetah in wild.

Jaipur, during early nineteenth century, was an important training centre for hunting cheetah (Sterndale, 1884) and a section of the city of Jaipur is still known as cheetawala Ka Mohalla. The cheetah trainers, Chhuttan Khan and Chhote Khan, both centurians are still alive with their clear memory, vividly remember that their wards used to be imported from Kabul, Afghanistan and from Africa. They inform that there were no wild cheetah in the princely state of Jaipur. The Cheetah School of Jaipur continued to get support for keeping the art alive, till 1922. It trained cheetahs for Princes of Saurashtra and of other Indian States.

According to our correspondence with Maharaja of Kolhapur, a state known for Cheetah hunting during the princely order, the cheetahs were always imported from East Africa. Baroda was another State where the sport of running down black buck had achieved perfection, but the State's hunting cheetah were always brought from Mombasa through a dealer (Personal communication with the Maharaja of Baroda Shri Fateh Singhji Gaekwad). Among the princely states of Saurashtra, now Gujarat, Bhavanagar was equally famous for organising hunting of black buck by hunting cheetah. Bhavanagar had its agent in Mombasa, Kenya, who regularly supplied African cheetah. The entire north western plains of India—Haryana, Rajasthan and Gujrat, were not only similar but better in habitat than the present east African plains where cheetah still exists. But no cheetah was found in these Indian Plains. We would like to continue the argument but in the present context it would be sufficient to conclude here that the hunting cheetah never existed in wild in Rajasthan.

TRADE IN CAT PELTS

Cat pelts have been in fashion for their softness, shades and markings on the fur. Top on the list of the fur trade are leopards, snow leopards, lynx and caracal. Even tiger skins

were picked up for expensive maxi coats during the late sixties. This resulted in alarming depredation of larger cats. And the Govt. of India had to enforce a total ban on the export of tiger and leopard skins. But illegally procured skins continued to be smuggled outside the country.

With the ban on export of fur of larger cats the traders explored other avenues of the trade and they found the pelt of lesser cats as an easy and profitable substitute. Unfortunately, the smaller cats were never taken serious and even the newly enacted Wildlife (Protection) Act, 1972 omitted species like the Jungle Cat. It did not find any place not even as a vermin. Even when the population of the Desert Cat is low and nothing much is known about its biology, it was placed in Sec. IV of the Wildlife (Protection) Act, 1972 providing opportunities for their killing on licence in unrestricted numbers. Atleast this incorrect position led to their being not taken seriously.

This lacuna was exploited to the fullest by the fur traders. One trader M/s Abdul Rasheed Abdul Gaffar of Mt. Abu Road in Rajasthan submitted his return no dated 10th Nov. 77 showing possession of 24,552 Jungle Cat skins alongwith 65,985 Jackal skins and 22,751 fox skins. Soon the numbers of these cats fell drastically due to unrestricted ruthless slaughter. The astronomical figures shocked all the conservationists. Concern was shown by the Speaker of Vidhan Sabha and urgent action was taken to get them up-graded to schedule I of the Wildlife (Protection) Act, 1972.

During the course of our studies we have discovered the operational methods of these traders. It was revealed that the main killer of the Cats are the nomadic Kalbalias and Jogies tribes of the desert. They through generations of professional hunting had come to master the cruel and ruthless operation of killing all kinds of animals and birds of their region. The killers survey the area and study the pug marks, spoors and locate burrows. On the fateful day they return early morning to locate fresh spoors and trace them to the burrow or to their sunning places. The burrows were thoroughly dug across, or the cat flushed out and chased by their hunting dogs. The exhausted cats are caught and killed. Small traps are also posed on frequented sites of the cats.

These people operate over vast stretches of desert waste land and collect skins which are sold to petty traders in villages and townships. Some of the centres are Tonk, Pali, Phalodi and Bansi in Rajasthan. These traders give heavy advances to the Jogies and thus ensures their supplies. The season to operate is winter when the pelts can be stored for longer period.

The trade is in the hands of a particular community, who stock larger quantities of skins, usually in their ladies compartment of their houses. It becomes tricky and sensitive

issue to search these apartments, without prior information. And if advance information is given the stock disappeared in minutes.

Transportation of the raw skins from village to State or International centre is also tricky. Usually the pelts are locked on the floor of the trucks and overlaid with stinking bones. Pungent Smell ensures the truck's easy clearance at check points and helps also to eliminate all chances of their being off loaded for search. Some times trucks carrying heavy sand stone slabs are also used as carriers. In all cases the skin smuggler pays the cost of transportation even of the bone and the stones.

We came across a marriage party which smuggled a consignment of skins in their boxes and bags meant for keeping brides clothes. The party came on donkeys.

CONCLUSIONS

The information presented in the paper is based on faded memory, some faintly jotted notes, stray observations, interviews with available professional hunters, reports of wildlife wardens and seizures of cat pelts from unauthorised traders. In spite of the best efforts, the assemblage of the information is meagre by all standards. The data so collected can hardly stand scientific analysis for much meaningful inference. Still, there is merit in the investigations. The observation of the authors are authenticated by photographic evidences. The interviews of the professional hunters whose livelihood depended on searching the wild cats can be considered reliable. The large number of pelts of the wild cats recovered from Pali, Jaisalmer and Phalodi serve as random collection of cats from the localities. These samples hint at population structures of the wild cats of the localities. Since no systematic census has been made population estimate of the cats is only an intelligent guess work. There are not more than a score of fishing cats, mostly confined to Bharatpur fresh water swamp and Jaisamand lake. The information about Jaisamand needs to be confirmed. There is little chance for population of the caracal to be more than 50. The desert cat is likely to be over 500 distributed over the vast tracks of the arid and semi-arid zone of the State. The only wild cat that is holding on is the jungle cat. We can estimate the population to be over 2000 scattered all over the State in pockets of woodlands and jungles. It has also adopted to agricultural fields.

The massacre of cats in hundreds and thousands (224 and 107 of desert cats at one place Phalodi at one time and 24552 Jungle cats in Sirohi district) mostly done by digging their burrows and open chase by hunting hounds, can wipe out the last traces of cats from the entire state without any warning. The whole race of the wild cats is in danger of extinction.

But the wild cats breed well and they still have enough of habitat and prey. They are not the ecologically doomed species. Only the destructive acts of man needs to be controlled. They deserve to be included in the Schedule I of the Indian Wildlife Protection Act 1972. We fail to understand the inaction in taking this measure when a strong recommendation was made on November 23, 1983 at the Cat Specialists meeting held at New Delhi.

A programme of reintroduction of lesser cats is urgent. The captive bred desert cats, fishing cats and even caracals can be reintroduced in suitable localities where protection has been ensured.

Hopes for reintroduction of the hunting cheetah are not encouraging since its existence in the past in these localities is doubtful.

The public relations of the lesser cats have been bad. The cats are beautiful, and wild cats are more beautiful, a poster campaign should be mounted to display the cats of each region. The WWF International can render valuable help in this programme.

The drawings and photographs produced in the recent book 'Endangered Species' by Tikedar (1983) is an indication of the poor illustrative material we have on our charming cats. It is a challenge to all the wildlife photographers to photograph the wild cats in wilderness of India.

It is time that lesser cats are given more attention to ensure their survival for our better, more beautiful and healthier environment.

References

- Anon, 1972. Wildlife Protection Act 1972, Govt. of India, New Delhi.
- Gupta, Rajkumar and Prakash Ishwar, 1975. Environmental Analysis of the Thar desert. English book depot Dehra Dun.
- Prakash Ishwar, 1961. The present status of caracal. J. Bombay Nat. Hist. Soc., 58. 791.
- Prater, S.H., 1965. The book of Indian mammals second (rev. sed) edition 1965.
- Saxena, V., 1975. A study of Flora and fauna of Bharatpur Bird Sanctuary, Govt. of Rajasthan.
- Sen, N.N. and Sankhala, K.S., 1962. Wildlife of Rajasthan—A study in ecology. Proceedings of the first all India congress on zoology 1959 Part 2, Scientific papers. Pages 258-268 with 4 plates.
- Sheshadri, B., 1969. The twilight of India's wildlife. London Oxford University Press.
- Sterndale, R.A., 1884. Natural History of the mammals of India and Ceylon. London.
- Tod, James, 1829. Annals and Antiquities of Rajasthan. Oxford University Press.

Lantana camara on Wildlife Habitats with special reference to the Melghat Tiger Reserve

By

V.B. SAWARKAR

Asstt. Professor, Wildlife Institute of India, Dehra Dun

Introduction

A native of Tropical America, the shrub *Lantana camara* (Linn.), has run wild in India since its first introduction in the National Botanical Garden, Calcutta during the year 1809 (Ghosh, 1980). It has invaded forested tracts as well as lands under other use categories. It is an ubiquitous weed in the village environs, a common sight in Dehra Dun and Saharanpur districts among other areas of Uttar Pradesh (Kanjilal, 1979). In Himachal Pradesh it is usually found below 1200 metres altitude in forests and pasture lands (Datta, 1957). In the Western Ghats and associated hill ranges it is present up to about 2000 metres elevation above MSL (Narayanan and Thyagrajan, 1958; Matthew, 1971). It is rampant in the forests of Marcará (Tireman, 1916). *Lantana* is said to have been introduced in Melghat, the Gavilgarh range of hills of Satpuras prior to the year 1890 from a South Indian provenance (Joshi, 1973). Over the entire extent of 1572 km² of the Melghat Tiger Reserve, there is hardly a compartment which does not have *Lantana* (Shaikh and Sawarkar, 1973). Bagshawe (1895) mentions in his Working Plan that *Lantana* had spread in Melghat along the higher altitudes of miscellaneous forest. Dunbar Brander (1916) observed that *Lantana* was widespread in Melghat (Joshi, 1973).

The *Lantana* problem profile

In Burma, *Lantana* was observed to be confined to open areas, which was attributed to its intolerance to shade (Burmese Forester, 1954). Such situation is obvious in India also. However, in forested tracts, specially in the dry deciduous biotope, *Lantana* is conspicuous even in well wooded and relatively shady places (Joshi, 1973). *Lantana* has established itself in the riparian zones of the Melghat Tiger Reserve, indicating that the species is not exacting in its demand for a situation of good overhead light although such conditions may be ideal for its establishment and spread. Sinha (1976) states that open blanks are particularly vulnerable to an invasion by *Lantana*. In the East and West Dehra Dun Forest Divisions, areas cleared for raising Eucalyptus and Shisham (*Dalbergia latifolia*) plantations are over-run by impenetrable thickets of *Lantana* below the canopy of the planted species. (Sawarkar Pers. Obs.). Matthew (1971) states that *Eupatorium repandum*, another aggressive weed has been displacing *Lantana* in several areas in the Western Ghats. In the Melghat Tiger

Reserve *Lantana* has not been able to encroach on habitats dominated by bamboo (*Dendrocalamus strictus*) and grasses (Joshi, 1973). In the Bijnor Plantation Division, U.P. wherever there is natural ground cover of thick grasses under the planted eucalyptus, *Lantana* has not been able to put in an appearance. In the wake of very heavy grazing pressure of the domestic livestock on the available grasses, forbs and shrubs on the village pastures, ideal conditions are created for establishment of *Lantana* due to lack of competition by other species. Such competition is necessary for its containment by other vegetation (Pratap Singh, 1976).

Lantana is a multidimensional problem weed. Twenty years ago it was not considered an economical problem in context of either agriculture or forestry in Burma. However a necessity for its control to prevent its spread was expressed (Burmese Forester, 1954). Across the Burmese border, in India, it was recognised as a problem weed at the turn of the 19th Century (Tireman, 1916; Joshi, 1973). *Lantana* is highly aggressive, it propagates effectively through seeds carried by a large number of species of wildlife, birds in particular. After feeding on its ripe drupaceous fruit, the seeds are expelled in the excreta. It also propagates by hardy root suckers (Joshi, 1973; Shaikh and Sawarkar, 1979¹). But for the ripe fruits with rare exceptions, the other portions of the plant are not eaten by either the birds or the wild and domestic animals. The telltale feeding signs are totally absent except in areas where domestic goats and camels traditionally feed. Goats have been seen to feed on *Lantana* leaves and younger twigs. Such shrubs then give the appearance of a typically heavily browsed plant. Camels eat the plant down to fairly thick stems (Sawarkar Pers. Obs.). The effects of such heavy browsing on the vigour of the shrub are not known. The author has also observed wild pigs (*Sus scrofa*) chewing on the roots of uprooted *Lantana* shrubs. The feeding on *Lantana* by goats and camels observed by the author in the plains of Berar and portions of Siwalik was not an indication of any overall depletion in the sources of food on the concerned sites as several other known palatable fodder species were accessible to these animals and hence *Lantana* was not used in the sense of 'Stuffing' (Leopold, 1933).

Lantana is toxic, unpalatable and is shunned by cattle (Webb, 1948; Chopra *et al.*, 1940). Icterus and photosensitization are said to be the prominent signs of *Lantana* poisoning in domestic animals (Watt *et al.*, 1962). The reported classical symptoms of *Lantana* poisoning include inflammation of mucosae and oedema of muzzle, ears and eye lids (Webb, 1948), weakness, staggering gait, stinking excreta, discharge from nose and eyes, diminishing milk yield, high body temperature and jaundice (McIntosh, 1935). Sanders (1946) has reported chronic poisoning symptoms in cattle which had fed on *Lantana* in Florida. The leaves and twigs of *Lantana* contain a toxic icterogenic principle *Lantanin* which has the

ability to induce photosensitization. The bark of the root contains tanin (Watt *et al.*, 1962).

Lantana thickets act as an effective barrier against the growth of grasses, forbs and shrubs favoured as food by wild herbivores and domestic cattle. The habitat potential in matter of production of food is thus directly affected (Shaikh, Sawarkar, 1979). Besides the Melghat Tiger Reserve there are several noteworthy wildlife areas, for example the Bandipur National Park, Nagarhole Wildlife Sanctuary, Panna and Corbett National Parks, Rajaji, Motichur and Kansrao Sanctuaries, Mudumalai and Wynaad Sanctuaries among others which have areas infested with Lantana.

Extensive Lantana dominated areas in the forests impede the natural regeneration of tree species and affect the performance of forest plantations (Joshi, 1973; Sinha, 1976). Invasion of village pastures by Lantana and other weeds have turned the pressure of grazing requirements of the domestic livestock on to the adjoining forested areas creating a situation in favour of the inexorable march of the weed on hitherto unaffected areas.

Lantana has proved to be a serious fire hazard as analysed in Melghat (Joshi, 1973). It is an excellent fuel and aids the fire to spread rapidly. The burning twigs rise on thermals created by fires, only to settle down haphazardly some distance away and start a new fire on their own. In hilly habitats like Melghat therefore, containing a forest fire is a very difficult proposition (Shaikh and Sawarkar, 1979). Tireman (1916) has rendered a graphic account of damage to tree species through fires abetted by Lantana.

Lantana thickets cause serious hinderance to timber operations. In the buffer zone of the Melghat Tiger Reserve timber is extracted under a conservative Selection System which integrates the forestry and wildlife interests (Saharia and Sawarkar, 1982). Lantana has to be removed over the area of the coupe under working before timber operations can be organised (Joshi, 1973).

Lantana Control Measures

Several techniques used for controlling Lantana are summarised below:

(a) *Controlled burning*: It was tried in Melghat in the early 1890s. Between 1921 and 1931 early burning at the advent of summer was tried with the hope that it would kill Lantana. It however proved ineffective and counter productive hence was given up (Joshi, 1973). Burning as a measure to control Lantana was considered ineffective by Sinha (1976). Shaikh and Sawarkar (1979¹) observed that fire could not control Lantana in Melghat. Tireman (1916) advocated immediate uprooting of Lantana following a burn but conceded that it was also a dangerous measure as fires are difficult to control and costwise the operation was prohibitive. Further if burning did not follow uprooting the weed tended to grow thicker.

(b) *Cutting and uprooting*: Manual uprooting and cutting of *Lantana* and use of elephant with dragging chains were tried in coupes under working in the buffer zone of the Melghat Tiger Reserve. Under a scheme for improvement of the Dhakna-Kolkaz Wildlife Sanctuary (now part of the Melghat Tiger Reserve) *Lantana* was uprooted along observation paths and along selected roadsides between the years 1967 to 1972 mainly to enhance the possibility of viewing wildlife (Joshi, 1973; Shaikh and Sawarkar, 1973). The measures did not provide a solution since root suckers gave rise to new shoots, and covered the area quickly. It was possible to cover only a limited area and the operation was costly.

(c) *Use of weedicides*: The impact of various weedicides on *Lantana* is cited by Kadambi and Dabral (1954), Narayanan and Thyagrajan (1958), Sinha (1976), Rego (1979), Ghosh (1980), Soni (1980). However chemicals that are used to make such preparations are capable of generating wide range of undesirable ecological implications in matters of their persistence, effects on invertebrate and vertebrate fauna, soil microflora and fauna, effects on aquatic environment and all the connected food chains which need proper evaluation before planning their use. The economics of such applications is likely to weigh against their use on the scale of an area management.

(d) *Biological control*: In Burmah 54 species of insects attacking various portions of *Lantana* were recorded (Burmese Forester, 1954). Anon. (1970) recommended introduction of the highly host specific *Plagiohammus spinipennis* in Australia to control *Lantana*. Trials in India have been recorded by Pratap Singh (1976), Bakshi (1977) and further trials continue. Success on a wide scale has not yet been reported.

It will thus be seen that although several approaches have been tried there is yet no viable solution for controlling the weed.

The positive side of *Lantana*

The menacing weed is not however without some positive qualities in its favour. It is an excellent soil binder and hence provides an effective cover to check soil erosion (Burmese Forester, 1954). Since *Lantana* often thrives on degraded lands it thus serves an important function of preventing further degradation through erosion if not enhancing the site quality and its utility.

The importance of *Lantana* for wildlife, specifically for birds and mammals was assessed in the Melghat Tiger Reserve over a period of four years from 1975 to 1979. It was assessed for selected cover function categories and food (berries only) as indicated under Table 1 for mammals and Table 2 for birds. Cover functions follow the concepts of Leopold (1933), Giles (1978) and Thomas (1979). Each function is ascribed a value of 10 and a use index

for each species is worked out as the sum total of all functions to express a broad picture of the relative importance of Lantana.

It will be seen from Table 1, that 21 species of mammals appear as 'Lantana users'. Of these two species (9.5%) appear in the high use category (above 40), 13 species (61.9%) in medium use (21-40) and 6 species (28.6%) in the low use category (20 and below). The most common use of Lantana is as hiding cover followed by its use as food. It is very important as a shelter and is an excellent ambush cover. Although outwardly, Lantana thickets appear vertically closed, they have sufficiently open and rather low 'tunnel' like spaces under the haphazardly drooping tight crowns. Tigers frequently dragged their kills under Lantana thickets through the 'tunnels' formed within the closely growing shrubs (Sawarkar, 1979). Out of 67 kills observed, 47 of the kills (70%) were noted to have been dragged under Lantana which also included large size sambar and cattle. Kills taking place around Lantana thickets were an indication of the usefulness of the shrub as an ambush cover. Similar patterns were apparent in case of leopards. Sloth bears (*Melursus ursinus*) heavily used the Lantana cover, specially during the period when ripe berries were available in plenty. (November onwards). The bear scats analysed were found to contain aggregates of Lantana fruit stones. A mother bear with cubs within Lantana thickets was not an uncommon sight in the tiger reserve, in fact several instances of encounters between local wayfarers and sloth bears with subsequent mauling cases have been typically associated with the period of sloth bear feeding activity on the berries of Lantana. The information on the other species is similarly recorded on the basis of field evidence including scats analyses and sightings of activity.

Ali and Ripley (1983) have recorded the association of several species of birds with Lantana chiefly in context of habitat and food (berries).

Under Table 2, seventy seven species of birds are listed as 'Lantana Users' in Melghat. Out of these none appear in the 'high use' category (31-50); 30 species (37.9%) are in the medium use (11-30) and 47 (62.1%) in the low use (below 11) categories respectively. The most common use is for perching (not related to feeding on berries), followed by the feeding activity on berries, feeding underneath the bushes on the ground, use as escape cover, use as nesting cover in that order. It must be clarified that the use indices state the extent of use in terms of the number of functions for a list of species but the nature of the function served is more important for an individual species.

Some gallenacious species of birds occur in high abundance in Melghat specially the grey jungle fowl, red and painted spur fowl and the pea fowl. One of the reasons is the enhanced survival of the young under Lantana shelter at a stage when they are most

vulnerable to predation. Similarly as recorded under Table 1, *Lantana* offers effective shelter to the young of 9 mammalian species and thus serves an important cover function with respect to the growing end of the population at a vulnerable stage.

There are certain interesting uses for *Lantana* worth a mention. The Plant is used as a herb bath and as a charm in Surinam. In West Africa its leaf is reportedly used as a remedy for cough and cold, as a diaphoretic and a stimulant, for jaundice and chest diseases, for relief from rheumatism in a bath (Watt *et. al.* 1962). Guha *et. al.* (1966) have indicated the possibility of manufacturing writing and printing paper from *Lantana*.

Wildlife management options

In the absence of viable solutions for controlling *Lantana* the wildlife management options are required to be seen in the light of what is practicable on the *Lantana* infested habitats to the best possible advantage.

(i) *Creation of edges*: The action of creating 'view lines' as seen in the Nagarhole sanctuary and Bandipur National Park, though oriented chiefly towards enhancing the wildlife viewing prospects, in fact creates an edge. The significance of the edge is also clearly demonstrated by the large number of herbivores making use of the cleared strips. The most obvious reason is the use of grass and to a lesser extent some browse. While in Nagarhole the view lines are cut along the roadsides, in Bandipur they are also cut in a criss-cross fashion within the thickets. The cleared area is then subjected to a light burn by drawing over the ground some smouldering pieces of tyre rubber which results in profuse growth of green grass without completely burning the grass. Large concentrations of spotted deer can be seen over the cleared lines. Such small clearings are also important for the barking deer (Prater 1971). Considerable 'ploughing' activity of the wild pig can be seen conspicuously on the clearings.

In planning the clearings it is necessary to keep in view the broad principles of best use. The view lines cut along the roadsides, and cuts placed away from roadsides will offer different use possibilities, specially if the road happens to be frequently used by traffic. (Thomas *et. al.* 1979). Along roadsides wildlife faces some disturbance which is not the case of sites away from it. In general a criss cross cutting pattern, leaving blocks of thickets in between will be better than a cut following one particular direction as the former will provide better interspersion of contrasting cover structures. In low lying areas Wallows can be created by opening *Lantana* cover along suitable ground conditions. Thus the uniformity of *Lantana* cover can be broken with advantage. Annual maintenance will of course be necessary. Cuttings should be properly planned to maximise the edge within the allocated effort

(Giles, 1978; Thomas, 1979). The edges should be monitored for various animal use categories to help evaluate the management action and plan for the better if necessary.

(ii) *Management of evicted village sites and grasslands:* Evicted village sites in their successional sequence to begin with give rise to predominant grasslands as seen in Kanha, Ranthambhor, Bandipur Tiger Reserves and the Bandhavgarh National Park. Careful management of such sites within the 'Lantana zone' is crucial for preventing the weed from marching on further. The objectives underlying village evictions on wildlife habitats stresses inter alia the elimination of heavy grazing pressures of domestic livestock which is also a strong consideration in favour of containing Lantana. But the situation may not always be ideal so as to exclude the possibility of cattle using such areas which has to be strictly guarded against. The site has to be effectively protected from fires to encourage establishment of grasses which in their turn prevent the possibility of encroachment of Lantana. Evicted village sites will frequently have other typical weeds like *Cassia tora*, *Xanthium strumarium* etc. These can be eliminated without taking recourse to the use of fire as demonstrated in Kanha (Panwar 1979). Suitable monitoring procedures such as those suggested by Sykes and Horrill (1976) be employed as a warning system against the possible progress of Lantana on such sites.

(iii) *Denuded areas along hill slopes* Lantana cover should not be disturbed on such sites, since any attempt at opening the cover will only encourage erosion.

(iv) *Stream Banks and Wildlife trails* Lantana cover along stream banks should not be cleared. It provides stability to the banks by binding the soil. Stream beds, specially the narrow and relatively dry beds are used regularly as travel routes by tigers and leopards (Shaikh and Sawarkar, 1979). A concealed route of travel is important for these species. There would also be several paths going through the Lantana thickets, well established through regular use as a footpath by the local man or as a trail by various wildlife species. (Bang and Dahlstrom, 1974). A network of pathways is important for a species in its home range (Ewer R. 1973). Lantana cover along such established pathways should not be altered.

Summary

Lantana camara (Linn.) was introduced in India from South America at the beginning of the nineteenth century. It has invaded large tracts of land all over the country and is recognised as an incorrigible pest in all forms of use of land. The paper presents a profile of the problems related to this weed, the control measures undertaken and attempts to analyse the weed's merits and demerits in general and in context of wildlife management in particular with a special reference of the Melghat Tiger Reserve, Maharashtra. In the absence of any viable approach to controlling Lantana on an area management scale, practical wildlife management options are discussed with Lantana viewed as a member community on the habitat.

Table 1
Use of *Lantana camara* by species of wild mammals in Melghat

Sl. No.	Species	Shelter	Hiding cover	Ambush cover	Sheltering young	Feeding on	Feeding under	Rated (Max:60)
1	2	3	4	5	6	7	8	9
1.	Tiger <i>Panthera tigris</i>	×	×	×	×	—	×	50
2.	Leopard <i>Panthera pardus</i>	×	×	×	×	—	×	50
3.	Wild Dog <i>Cuon alpinus</i>	×	×	—	—	—	—	20
4.	Hyena <i>Hyaena hyaena</i>	×	—	—	—	—	—	10
5.	Sloth Bear <i>Melursus ursinus</i>	×	×	—	×	×	—	40
6.	Ratel <i>Mellivora capensis</i>	—	—	—	—	×	×	20
7.	Jackal <i>Canis aureus</i>	×	×	—	×	×	—	40
8.	Indian Fox <i>Vulpes bengalensis</i>	—	×	—	—	×	×	30
9.	Jungle cat <i>Felis chaus</i>	×	×	×	—	—	×	40
10.	Palm civet <i>Paradoxurus hermaphroditus</i>	—	—	—	—	×	×	20
11.	Small Indian Civet <i>Viverricula indica</i>	—	×	—	—	×	×	30
12.	Gaur <i>Bos gaurus</i>	—	×	—	×	×	—	30
13.	Sambar <i>Cervus unicolor</i>	×	×	—	×	×	—	40
14.	Nilgai <i>Boselaphus traocamelus</i>	—	—	—	—	×	—	10
15.	Cheetal <i>Axis axis</i>	×	×	—	×	—	—	30
16.	Chausingha <i>Tetraceros quadricornis</i>	×	×	—	×	—	—	30
17.	Barking deer <i>Muntiacus muntjack</i>	×	×	—	×	—	—	30
18.	Wild Pig <i>Sus scrofa</i>	×	×	—	—	×	×	40
19.	Common Mongoose <i>Herpestes adwardsi</i>	—	×	—	—	×	×	30
20.	Indian Porcupine <i>Hystrix indica</i>	—	×	—	—	×	×	30
21.	Three striped Palm squirrel <i>Funambulus palmarum</i>	—	—	—	—	×	—	10
No. of Species in each cover function :		12	16	3	9	13	10	

Table 2

Use of *Lantana camara* by species of birds in Melghat

Sl. No.	Species	Perching and/or catching insects	Feeding on ground among bushes	Perching and feeding on berries	Use as cover	Nesting on	Rated value (Max. 50)
1	2	3	4	5	6	7	8
1.	Grey Quail <i>Coturnix coturnix</i>	—	×	—	×	—	20
2.	Rain Quail <i>Coturnix coromandelica</i>	—	×	—	×	—	20
3.	Jungle Bush Quail <i>Perdica asiatica</i>	—	×	—	×	—	20
4.	Rock Bush Quail <i>Perdica argoondah</i>	—	×	—	×	—	20
5.	Red Spurfowl <i>Galloperdix spacidea</i>	—	×	×	×	—	30
6.	Painted Spurfowl <i>Galloperdix lunulata</i>	—	×	×	×	—	30
7.	Grey Junglefowl <i>Gallus sonneratti</i>	—	×	×	×	—	30
8.	Indian Peafowl <i>Pavo cristatus</i>	—	×	×	×	—	30
9.	Little Bustard Quail <i>Turnix sylvatica</i>	—	×	—	×	—	20
10.	Yellowlegged Button Quail <i>Turnix tanki</i>	—	×	—	×	—	20
11.	Indian Bustard Quail <i>Turnix suscitator</i>	—	×	—	×	—	20
12.	Green Pigeon <i>Treron phoenicoptera</i>	—	—	×	—	—	10

1	2	3	4	5	6	7	8
13.	Ring Dove <i>Streptopelia decaocto</i>	—	×	—	—	—	10
14.	Spotted Dove <i>Streptopelia chinensis</i>	—	×	—	—	—	10
15.	Large Indian Parakeet <i>Psittacula eupatria</i>	—	—	×	—	—	10
16.	Roseringed Parakeet <i>Psittacula krameri</i>	—	—	×	—	—	10
17.	Blossomheaded Parakeet <i>Psittacula cy노cephala</i>	—	—	×	—	—	10
18.	Pied Crested Cuckoo <i>Clamator jacobinus</i>	×	—	—	—	—	10
19.	Indian Plaintive Cuckoo <i>Cacomantis merulinus</i>	×	—	—	—	—	10
20.	Indian Koel <i>Eudynamys scolopace</i>	—	—	×	—	—	10
21.	Small Greenbilled Malkoha <i>Rhopodytes viridirostris</i>	—	×	—	×	—	20
22.	Sirkeer Cuckoo <i>Taccocua leschenaultii</i>	—	×	×	×	—	30
23.	Grow Pheasant <i>Centropus sinensis</i>	—	×	—	×	—	20
24.	Central Indian Trogon <i>Harpactes fasciatus</i>	×	—	—	—	—	10
25.	Small Green Bee-eater <i>Merops orientalis</i>	×	—	—	—	—	10
26.	Green Barbet <i>Megalaima zeylanica</i>	—	—	×	—	—	10

1	2	3	4	5	6	7	8
27.	Crimsonbreasted Barbet <i>Megalaima haemacephala</i>	—	—	×	—	—	10
28.	Indian Pitta <i>Pitta brachyura</i>	—	×	—	—	—	10
29.	Redwinged Bushlark <i>Mirafra erythroptera</i>	—	×	—	—	—	10
30.	Grey Shrike <i>Lanius excubitor</i>	×	×	—	—	×	30
31.	Baybacked Shrike <i>Lanius vittatus</i>	×	×	—	—	×	30
32.	Rufous Backed Shrike <i>Lanius schach</i>	×	×	—	—	—	20
33.	Brown Shrike <i>Lanius cristatus</i>	×	×	—	—	—	20
34.	Golden Oriole <i>Oriolus oriolus</i>	—	—	×	—	—	10
35.	Blacknaped Oriole <i>Oriolus chinensis</i>	—	—	×	—	—	10
36.	Blackheaded Oriole <i>Oriolus xanthornus</i>	—	—	×	—	—	10
37.	Ashy-swallow Shrike <i>Artamus fuscus</i>	×	—	—	—	—	10
38.	Grayheaded Myna <i>Sturnus malabaricus</i>	—	—	×	—	—	10
39.	Brahminy Myna <i>Sturnus pagodarum</i>	—	—	×	—	—	10
40.	Pied Myna <i>Sturnus contra</i>	—	—	×	—	—	10
41.	Indian Myna <i>Acridotheres tristis</i>	—	—	×	—	—	10
42.	Jungle Myna <i>Acridotheres fuscus</i>	—	—	×	—	—	10
43.	Tree Pie <i>Dendrocitta vagabunda</i>	×	—	×	—	—	20

1	2	3	4	5	6	7	8
44.	House Crow <i>Corvus splendens</i>	—	—	×	—	—	10
45.	Jungle Crow <i>Corvus macrorhynchos</i>	—	—	×	—	—	10
46.	Blackbacked Pied Flycatcher-shrike <i>Hemipus picatus</i>	×	—	—	—	—	10
47.	Indian Wood Shrike <i>Tephrodornis pondicerianus</i>	×	—	—	—	—	10
48.	Iora <i>Aegithina tiphia</i>	×	—	—	—	—	10
49.	Redwhiskered Bulbul <i>Pycnonotus jocosus</i>	—	—	×	×	×	30
50.	Redvented Bulbul <i>Pycnonotus cafer</i>	—	—	×	×	×	30
51.	Whitebrowed Bulbul <i>Pycnonotus luteolus</i>	—	—	×	×	×	30
52.	Yelloweyed Babbler <i>Chrysomma sinense</i>	—	—	×	×	×	30
53.	Common Babbler <i>Turdoides caudatus</i>	—	—	×	×	×	30
54.	Large Grey Babbler <i>Turdoides malcolmi</i>	—	—	×	—	×	20
55.	Jungle Babbler <i>Turdoides striatus</i>	—	—	×	×	×	30
56.	Quaker Babbler <i>Alcippe poiocephala</i>	×	—	—	—	—	10
57.	Whitebrowed Blue Flycatcher <i>Muscicapa superciliaris</i>	×	—	—	—	—	10
58.	Verditer Flycatcher <i>Muscicapa thalassina</i>	×	—	—	—	—	10
59.	Whitebrowed Fantail Flycatcher <i>Rhipidura aureola</i>	×	—	—	—	—	10
60.	White Spotted Fantail Flycatcher <i>Rhipidura albicollis</i>	×	—	—	—	—	10

1	2	3	4	5	6	7	8
61.	Paradise Flycatcher <i>Terpsiphone paradisi</i>	×	—	—	—	—	10
62.	Blacknaped Monarch Flycatcher <i>Monarcha azurea</i>	×	—	—	—	—	10
63.	Streaked Fantail Warbler <i>Cisticola juncidis</i>	×	—	—	—	—	10
64.	Tailor Bird <i>Orthotomus sutorius</i>	×	—	—	—	—	10
65.	Magpie Robin <i>Copsychus saularis</i>	×	—	—	—	—	10
66.	Redstart <i>Phoenicurus ochruros</i>	×	—	—	—	—	10
67.	Collared Bushchat <i>Saxicola torquata</i>	×	—	—	—	—	10
68.	Pied Bushchat <i>Saxicola caprata</i>	×	—	—	—	—	10
69.	Black Robin <i>Saxicoloides fulicata</i>	×	—	—	—	—	10
70.	Whitethroated Ground Thrush <i>Zosterops citrina</i>	—	×	—	—	—	10
71.	Black <i>Turdus merula</i>	—	×	×	—	—	20
72.	Grey Tit <i>Parus major</i>	×	—	—	—	—	10
73.	Yellow Cheeked Tit <i>Parus xanthogenys</i>	×	—	—	—	—	10
74.	White Eye <i>Zosterops palpebrosa</i>	×	—	—	—	—	10
75.	Green Munia <i>Estrilda formosa</i>	×	×	—	—	—	20
76.	Whitebacked Munia <i>Lonchura striata</i>	×	—	—	×	×	30
77.	Spotted Munia <i>Lonchura punctulata</i>	×	—	—	×	×	30
No. of Species in each Cover Function		33	25	31	22	11	

References

- Ali Salim and Ripley Dillon, S. (1983). Handbook of the Birds of India and Pakistan. Compact Edn. Oxford, pp. 737.
- Anon. (1970). *Lantana* and its control in Australia and Hawaii. Ind. For. 96(6), 428.
- Bagshawe (1895). In Working Plan for Melghat Forests by P.P. Joshi (1973).
- Bakshi, B.K. (1977). Disease Insect Survey Report F.R.I. (1975-1977), pp. 443.
- Bang, P. and Dahlstrom, P. (1974). Collins Guide to Animal Tracks and Signs. Collins, Glasgow, pp. 239.
- Burmese Forester (1954). Is *Lantana* an economic problem in Burma's hill region? If not what problem is it, where and how to tackle it? Vol. IV, No. 2. pp. 96-99.
- Chopra, R.N. Badhwar, R.L., Ghosh, S. (1940). Poisonous Plants of India. Govt. of India, Press, Calcutta, pp. 762.
- Datta, R.C. (1957). Experience with exotics and Future Line of Work. First regional meeting of Silviculturists, Himalayan Region, Kashmir.
- Dunbar Brander (1916). In Working Plan for Melghat Forests by P.P. Joshi (1973).
- Ewer, R.F. (1973). The Carnivores, Weidenfeld and Nicolson, London.
- Giles, R.H. Jr. (1978). Wildlife Management, W.H. Freeman and Co., San Francisco, pp. 416.
- Ghosh, R.C. (1980). Chemical control of *Lantana camara* and *Imperata cylindrica*—Two major weeds in the forests of India. 11th Commonwealth Forestry Conference, pp. 20.
- Guha, S.R.D., Pant, P.C., Mathur, G.M. and Sharma, Y.K. (1966), Writing and Printing Papers from *Lantana camara*. Ind. For. 92 (2), 122.
- Joshi, P.P. (1973) Working Plan for Melghat Forests, Forest Deptt. Maharashtra.
- Kadambi, K. and Dabral, S.N. (1954). Preliminary note on the use of Butyl Ester in eradicating *Lantana*. Ind. For. 80 (9), 574-576.
- Kanjilal, U. (1979). Forest Flora of the Chakrata, Dehra Dun and Saharanpur Forest Divisions, United Provinces—Edn. by Gupta, B.L., Govt. of India Press, Calcutta, pp. 558.
- Leopold Aldo. (1933). Game Management, Charles Scribner's Sons, New York, pp. 481.
- Matthew, K.M. (1971). The High Altitude Ecology of the *Lantana*. Ind. For. 97 (3), pp. 170.
- McIntosh, K.S. et al. (1935). Qd. Agric. J. 43, 369.
- Narayanan, T.R. and Thyagrajan, N.M. (1958). Making Short Work of *Lantana*. Indian Farming, Vol. VIII (1) 14.

- Panwar, H.S. (1979). Position Paper, Kanha Tiger Reserve. International Symp. on Tiger, New Delhi, India.
- Pratap Singh. (1976). Lantana Weed and the Lantana Lace Bug. Ind. For. 102 (7), 474-476.
- Prater. (1971). Book of Indian Animals. JBNHS, Bombay, pp. 323.
- Rego, L.H.A. (1979). A Handbook on Soil Conservation and Afforestation. Govt. Central Press, Bombay, pp. 135.
- Saharia, V.B. and Sawarkar, V.B. (1982). Wildlife Habitats and Relations to Silvicultural Practices. National Seminar on Forest and Environment, Bangalore, India.
- Sanders. (1946). J. Ame. Vet. Med. Ass. 109, pp. 139.
- Sawarkar, V.B. (1979). Some aspects of predation on domestic livestock by tigers in the Melghat Tiger Reserve. Int. Symp. on Tiger, New Delhi.
- Shaikh, K.A. and Sawarkar, V.B. (1973). Wildlife Management Plan for the Melghat Tiger Reserve. Govt. of Maharashtra, pp. 282.
- (1979¹). Position Paper, Melghat Tiger Reserve ISOT
New Delhi, India.
- (1979²). Study of some aspects of maintenance of
Spatial Relationships in Tigers and Leopards in the Melghat Tiger Reserve ISOT,
New Delhi, pp. 53.
- Sinha, P.M. (1976). Studies on use of some weedicides on *Lantana camara*. Ind. For. 102 (5), 298-305.
- Soni Prafulla. (1980). Weed Control in *Pinus* plantations—Effect of Weedicides on the growth of *Lantana camara*. Ind. For. 106 (6), 431-436.
- Sykes, J.M. and Horrill, A.D. (1976). Vegetation Monitoring in Indian Tiger Reserves—a report to the W.W.F. International Institute of Terrestrial Ecology, Cumbria, pp. 69.
- Thomas, Jack Ward. Ed. (1979). Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington, USDA, Forest Service, Handbook No. 553, pp. 512.
- Thomas, J.W., Black, H., Scherzinger, R.J. and Pedersen, R.J. (1979). 'Deer and elk' in Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington USDA, Forest Service, Handbook No. 553, pp. 104-127.
- Tireman, H. (1916). Lantana in the Forests of Coorg. Ind. For. XLII (8), 385-392.
- Watt, J.M., Gerdina Maria and Breyer-Brandwijk. (1962). The Medicinal and Poisonous Plants of Southern and Eastern Africa. E & S Livingstone Ltd., London, pp. 1475.
- Webb, L.J. (1948). Coun. Sci. Industr. Res. Australia, Bull. 232.

Conservation of Nature and Problems of the Collectors and Sub-Divisional Officers

By

DR. M.K. RANJITSINH, I.A.S.

Webster's dictionary defines the word "Patriot" as a person who loves his country and zealously defends it and its interests. A patriot is also a person who is prepared to sacrifice his own interests for those of his country. Thus one who guards his country's wildlife and forests is a patriot.

Though the official figures record that approximately 23% of the land area of India as forest land, a report of the National Committee on Environmental Planning states that only about 12% of the land area of the country is under adequate tree cover, with barely 2% of the forest cover approaching its natural richness. Between 1947 and 1980 the State of Madhya Pradesh holding the largest forest area of any state in the country, was losing forest lands at the rate of 0.13 million hectares per year, and according to some estimates the annual loss of forest land in India could be as high as a million hectares.

It is estimated that there are 94 million hectares of eroded land in the country. 9.5 million hectares of forest lands are affected by shifting cultivation, mainly in the north-eastern states. Madhya Pradesh has lost a major portion of its bamboo forests so vital for commercial and domestic usage. A recent report of the IUCN claims that India has lost in the past 80 years almost 2.5 million hectares of mangrove forest so crucial for coastal conservation and coastal fisheries. The grasslands amongst the most productive territorial ecosystems of the country have all but disappeared. The country is already facing an acute fuelwood shortage in the mountains of northern India and most parts of peninsular India. In the next decade the areas which are not short of firewood today will be so, and a shortfall of 182 million cubic metres of firewood is predicted by the year 2000, even if all the plantations planned today are successful. Over a lakh of trees are being cut annually in the Himalayas to make apple crates.

There are over 180 million cattle and 60 million buffaloes in India, more than in any country in the world, and the population is rising approximately at the ratio of 2:1 in relation to economic growth.

Not only are natural areas—terrestrial and aquatic—vital for the socio-economic existence and ecological survival of the country, but they also provide the richest genetic storehouse the economic value of which is barely realised today. About 15,000 species of plants

out of a known world total of 250,000 and 75,000 animal species of world total of 1.5 million have been described from India. On 2% of the world's landmass we possess about 5% of the known living organisms on earth. Almost 50% of India's floral species are found in the north-eastern region of the State so devastated by shifting cultivation and deforestation. Many a species of plants will perish before their possible value to mankind and to the living world, is discovered.

I began this paper by defining the word 'Patriot'. In so far as conservation involves the protection and appropriate management of the ramnant natural areas so crucial for the survival of man and the protection of the last vestiges of their national and world natural heritage, conservationists the world over are the greatest selfless patriots of all. In India, as in many developing countries, a conservationist should be prepared to be a martyr. The problem of the Collector and the SDO vis-a-vis nature conservation and the role that these officers could play in the endeavour would best be analysed by discussing five categories of areas. These are national parks, wildlife sanctuaries and reserves, government owned forests outside these protected areas, privately owned or communal lands and lastly, aquatic areas.

It is a recognised fact that the easiest and most apt way to save an important watershed, ecosystem or wildlife area is to establish a national park thereon. It is an interesting phenomenon that whilst the people come to accept the complete stoppage of exploitation as should be and is with most national parks, it is far more difficult to enforce controlled usage which the wildlife sanctuaries mainly strive to achieve. Once the principle of non-use comes to be accepted as it does surprisingly soon, the glamour dies down. On the other hand controlled exploitation and rotational grazing, for instance, are a constant source of friction and defiance in wildlife sanctuaries. The pristine forests of the Periyar Sanctuary in Kerala still survive, surrounded though they are by some of the most densely inhabited areas in the world, because exploitation was never permitted there. Yet a little northwards the magnificent forests of the cardamom Hills, though a reserve forest and legally accorded the same legal protection as Periyar but commercially exploited and not a part of a sanctuary or national park, have all but gone. The transformation that greets one upon entry into isolated 'pockets' paradises like Kanha and Manas, Bandhavgarh and Ranthambhor, is almost unbelievable. It is only in these islands of hope that nature, let alone wild animals, have a hope for survival in the twentieth century.

It is my firm conviction that with demographic pressures mounting as they are, the nature reserves created in the current decade may well be the last to be effectively established in India. Under these circumstances it becomes the duty of every patriot, most of all the decision makers in government, to help establish as many protected areas as possible and help them to become effective and viable units of conservation.

The approach however, in the creation of protected areas would have to be different. The ploy in the past has been to get areas for the sake of the animals. The strategy henceforth must be to get the areas with the animals, ecosystems and watersheds, for the sake of man. Even in the conservation of wildlife, habitats and wilderness areas are more important than the wild animals themselves—the former can exist without the latter, not the other way around. And if the national parks and sanctuaries are to survive as effective conservation units, they can only do so in the long term with at least the acceptance of the neighbouring peoples, if not their active support. In this regard the guardians of our national parks have not been too successful; in fact there has hardly been a serious attempt to wean the support of the rural population, especially those who live in and around the national parks and sanctuaries. In this matter the Collector and the SDO can play very significant roles which would be discussed later.

There is another aspect which should not be lost sight of. Very frequently, especially in the past, the forest departments of the various States themselves are very reluctant to suggest new protected areas or the enlargement of existing ones. This state of mind stems partly from a sense of euphoria that enough areas have already been created, but mainly because the forest departments are reluctant to give up or modify commercial exploitation in forests. To cite but one example, the large majority of national parks and 31 sanctuaries in the state of Madhya Pradesh were originally proposed not by the guardians of the forests, but by administrators.

Sections 19 to 26 of the Wildlife (Protection) Act 1972 bestow upon the Collector or any other officer so directed by the State Government in this regard, the powers to determine individual rights in notified sanctuaries and after due enquiry and process to acquire such rights. In lieu the Collector or any other officer specified in this regard can pay compensation, and in case of acquisition of a public way or common pasture, offer alternatives outside the notified sanctuary or park. Once the private rights have been acquired, the State Government could declare the area to be a national park, under section 35 of the Act.

Once a national park has been established, it may well be necessary to shift the villages situated within the precincts of the park to outside it. Ideally, the sites for the relocation of such villages should be on revenue land at some distance from the park. But if lack of adequate culturable land or the claims on available land by others make such site selection not possible, then the relocation site would have to be forest land which could be spared with the least damage to the existing forest. In both cases the Collector and the SDO can and would have to play a vital active role. Firstly, it would be necessary to motivate the villagers and to obtain their consent. This would presage the preparation of a proper scheme for relocation, providing more and better land, if possible with irrigation facilities, housing

sites and material and other facilities. In the relocation of villages from the Kanha National Park and the Gir the new lands were first ploughed by the government and then handed over. Facilities such as roads, school buildings, tanks, wells and others could be provided under the development schemes. The relocation schemes must be both beneficial to the concerned villagers and must be efficiently implemented, the approach being not that of eviction of the people but of rehabilitation in a better settlement. Only then can the project succeed.

For those whose rights and practices of grazing, collection of fuelwood and other forest produce have been stopped or curtailed in national parks and sanctuaries, alternatives would have to be provided as far as possible and the stoppage and regulation of these practices usually pose the greatest problems to the administration. The first step should be to stop much exploitation by those other than the ones residing in and on the periphery of the protected areas, and in this endeavour there is usually little difficulty and often the support of the resident population who stand to gain from the reduction in competition for the same commodities. All efforts need to be made to create a vested economic interest of these local populations in the protected areas, by providing them employment and other benefits. Their fuelwood, bamboo and other domestic needs from the forest could be provided ex-gratia by the park authorities, rather than let the people resort to theft. In sanctuaries they should be encouraged to cut the grass and feed their livestock, or even sell it, in lieu of grazing domestic stock on the sanctuary premises.

All protected areas in India, particularly the smaller ones, are faced with a very ominous threat of biological and ecological isolation. These areas already are fast becoming islands whose inmates are hemmed in these confines, condemned to genetic isolation. If the protected areas are to act as viable gene-pools and conservation units, buffers and corridors must exist to link them with other conservation units and the maintenance of such land bridges the administrative authorities would have to play a very significant role and control of exploitation practices around these areas as livestock graze around, the threat of bovine contagion is always present.

The reaction of local politicians and bodies to the establishment of protected areas is of some interest. My experience has been that the initial creation is frequently greeted with enthusiasm and sometimes suggestions for the setting up of such areas emanate from these gentry. Once, however, the real implications of the protected area—the stoppage or curtailment of exploitation and easements—become evident, the opposition to the areas starts manifesting itself. If alternatives are provided and acquiescence or acceptance of the local people obtained, the opposition recedes, especially as the park or sanctuary starts to be recognised and more widely known.

As regards the government owned forest lands outside of parks and sanctuaries which constitute the very large majority of our wilderness areas, and which are being subjected to the most persistent abuse in varying degrees, the most urgent and important requirement is to create a perestake of the local inhabitants in these forests. Today, the approach has been to safeguard the forests from the tribals and locals to harvest it in the interests of other. If this continues the forests are doomed. It is also essential to propagate farm forestry and social forestry particularly of quick growing species like bamboos and fuelwood trees which can provide the domestic demands of the people and thereby reduce the illegal cutting of forests. In these endeavours the administrators can play a very significant role, as funds can be provided for forestry under the various rural development and employment schemes. The administrators will often be asked to provide funds, build roads in forests to 'develop' the areas. Such roads more often than not help destroy the forests by making for commercial purposes easier. In the words of Aldo Leopold "Development is a job not of building roads into lovely country, but of building receptivity into the still unlovely human mind."

The Forest (Conservation) Act, 1980 lays down that forest lands can not be excised or diverted for non-forestry purposes without the prior permission of the Central Government. Though the main responsibility of supporting or rejecting proposals for diversion of forest lands rest with authorities of the forest department, great local and other possessors are brought to bear upon these authorities to either circumvent the law or to recommend diversion. It is the duty of the district administration to support the forest authorities to uphold an appropriate decision.

In privately owned and communal lands and aquatic areas very often the populations of large animals which have survived has been due to the religious sentiments and soul of the local peoples, the Bishnois in Rajasthan and the vala Kathis of Gujarat to cite some examples. The administrators should encourage and support the conservation efforts of the local people and indeed of non-governmental organisations and societies which support the cause of conservation. Activities of trappers, traders and taxidermists who deal in wildlife and products derived therefrom would also have to be effectively controlled and alternative employment offered. The trappers often indulge in other illegal activities and by administrators preventive sections of the Criminal Procedure Code to such communities the applying the can also aid the maintenance of law and order.

The crop raiding propensities of animals like the nilgai, blackbuck and wild boar and the cattle killings of lion, tiger and leopard also bring animals in conflict with man. Where there is occurrence of man-eating, the concerned animal must be disposed of as expeditiously as possible. For the destruction of human property, the authorities would have to provide

compensation where possible, and elsewhere assistance to the people in scaring away of the raiding wild animals.

As regards the aquatic areas, the prevalent practices of fishing and of local exploitation on marine coast renders the conservation of such areas problematic, and is the reason why marine national parks and reserves are so conspicuously lacking in this country. Over-exploitation and the usage of dynamite are common. The destruction of the crocodilians and overkill of the turtles also takes place. In the control over the catch, the size of the nylon gill nets to prevent the killing of undersized fish and the phasing out of commercial exploitation of corals, the administrators could make very significant contributions.

In the final reckoning, the role of the administrator in the field of nature conservation depends upon the state of mind. If the administrator confines himself merely to his direct and overt responsibilities, to the papers that are put upto him and regards his responsibilities as just another transient job, then he shall not have the need to assist nature conservation except by way of fulfilling his duties in accordance with the provisions of law, and by channelising some funds for social forestry. If, however, the IAS Officer takes up this task with devotion, if not as one of his mission in life, then his contribution can be greater than the representative of any other government services in India.

Mammals of Garhwal Region

By

B.S. LAMBA, P.C. TAK AND GIRISH KUMAR

Introduction

The Garhwal region is comprised of five districts, viz. Uttarkashi, Chamoli, Tehri, Pauri and Dehra Dun of Uttar Pradesh, India. The region is geographically situated between the coordinates of $29^{\circ}27'$ to $30^{\circ}33'$ N latitudes and $77^{\circ}48'$ to $80^{\circ}06'$ E longitudes. The altitude rises from *ca* 303 m (1000') in the south to *ca* 7817 m (25,654') in the north. As the altitude increases the forest type changes from Tropical Moist Deciduous Forest at lower altitudes through Subtropical Pine Forests, Himalayan Moist Alpine Scrub to Dry Alpine Scrub at higher altitudes. A narrow belt of bhabar (porous detrital piedmont) skirts the hills to the south. The largest glacier, viz., Gangotri Glacier of the region of *ca* 29 km length is situated in the district Uttarkashi. The Ganges, formed by the confluence of the Bhagirathi and the Alaknanda at Devprayag, controls the drainage (map).

A reconiter of the existing literature reveals that the Indian vertebrate (birds and mammals) fauna of this region is, more or less, well explored. Although a number of faunal lists of the Kumaon and Garhwal hills exist scattered all over the Indian Zoological Literature (Lamba *et al.* 1976) but no extensive faunal survey was ever carried out, probably on account of very tough approach and hostile weather conditions of the higher reaches e.g. Nanda Devi National Park. It is precisely with this point in view that the present study was undertaken by the authors, during the course of their trips to the Nanda Devi, Chamoli (1981-83); Nayyar Valley Catchment area, Pauri (1983); Dokriani Bamak/Glacier, Uttarkashi (1983) and almost a continuous stay at Dhikala in Corbett National Park, Pauri (1976-79). A systematic list of birds and mammals they observed was prepared. The areas, as shown in the map, by dark oblique lines, were surveyed, by establishing more than 50 camps (excluding the continuous stay at Corbett National Park) and explored several localities therein hitherto zoologically underexplored or unexplored. Altitudinally, an area from *ca* 303 m (1000') to *ca* 5488m (18,000') was covered and a total of 60 species of mammals and 586 species of birds was recorded. These lists prepared so painstakingly are by no means exhaustive and are likely to be augmented further by observations in future. The following lists are based on actual observations made by the authors at various times of the year and supported by recorded geographical distribution of the species (species marked with asterik in the list).

I. MAMMALS

By

B. S. LAMBA AND P. C. TAK

Class : Mammalia
 Order : Insectivora
 Family : Erinaceidae

01. *Hemiechinus auritus collaris* (Gray). Long-eared Hedgehog.02. *Paraechinus micropus micropus* (Blyth). Indian Hedgehog.

Family : Soricidae

*03. *Suncus ectruscus micnyx* (Blyth). Sevi Pygmy Shrew.

Order : Chiroptera
 Family : Pteropidae

04. *Pteropus giganteus giganteus* (Brunich). Indian Flying Fox.

Family : Rhinolophidae

05. *Rhinolophus petersii* Dobson.06. *Rhinolophus affinis himalayanus* Anderson.

Family : Vespertilionidae

*07. *Natalus (?) leisleri montanus* (Barret-Hamilton); Hairy armed Bat.08. *Pipisterellus coromandra coromandra* (Gray); Indian Pipistrellus.*09. *Murina huttoni* (Peters).10. *Murina grissa* (Peters); Peter's Tube-nosed Bat.

Order : Primates
 Family : Cercopithecidae

11. *Macaca mulatta villosa* True; Rhesus Macaque.12. *Macaca assamensis Pelops* Hodgson; Assamese Macaque13. *Presbytis entellus schistaceus* Hodgson; Langur or Entellus Monkey.

Order : Carnivora
 Family : Canidae

14. *Canis aureus aureus* Linnaeus; Asiatic Jackal.15. *Vulpes vulpes montana* (Pearson). Hill Fox or The Red Fox.

Family : Ursidae

16. *Melursus ursinus* (Shaw): Sloth Bear.
 17. *Selenarctos tibetanus* (G. Cuvier): Asiatic Black Bear.
 *18. *Ursus arctos* Linnaeus. (Himalayan) Brown Bear.

Family : Mustelidae

19. *Lutra lutra monticola* Hodgson: Common Otter.
 20. *Martes flavigula* (Boddaert): Yellow-throated Marten.
 21. *Mustela sibirica hodgsoni* Gray : Siberian Weasel.

Family : Viverridae

22. *Herpestes edwardsi nyulua* (Hodgson) : Indian Grey Mongoose.
 23. *Paguma larvata grayi* (Boonett): Masked Palm Civet.
 24. *Paradoxurus hermaphroditus bondar* Desmarest : Common Palm Civet.
 25. *Viverricula indica wellsi* Pocock : Small Indian Civet.

Family : Hyaenidae

- *26. *Hyaena hyaena* (Linnaeus) : Striped Hyena

Family : Felidae

27. *Felis chaus affinis* Gray : Jungle Cat.
 28. *Felis bengalensis horsfieldi* (Gray) : Leopard Cat.
 29. *Felis viverrina* Bennet : Fishing Cat.
 30. *Panthera pardus* (Linnaeus) : Leopard or Panther.
 31. *Panthera tigris tigris* Linnaeus: Tiger.
 *32. *Panthera uncia* (Schreber) : Snow Leopard or the Ounce

Order : Proscoidae

Family : Elephantidae

33. *Elephas maximus maximus* Linnaeus : Indian Elephant.

Order : Artiodactyla

Family : Suidae

34. *Sus scrofa cristatus* Wagner : Wild Boar.

Family : Cervidae

35. *Axis axis axis* (Erxleben): Chital or Spotted-Deer.

36. *Axis porcinus porcinus* (Zimmermann) : Para or Hog-Deer.
 37. *Cervus unicolor unicolor* Kerr: Sambar.
 *38. *Cervus duvauceli duvauceli* Cuvier : Barasingha or Swamp Deer.
 39. *Muntiacus muntjak vaginalis* (Boddaert) : Barking Deer.
 40. *Moschus moschiferus* Linnaeus : Musk Deer.

Family : Bovidae

41. *Boselaphus tragocamellus* (Pallas): Nilgai or Blue Bull.
 42. *Capricornis sumatraensis sumatraensis* (Bechstein) : Serow.
 43. *Hemitragus jemalhicus jemalhicus* (H. Smith) : Himalayan Tahr.
 44. *Naemorhedus goral goral* (Hardwicke) : Grey Goral.
 45. *Pseudois nayaur nayaur* (Hodgson) : Bharal or Blue Sheep.

Order : Lagomorpha

Family : Leporidae

46. *Lepus nigricollis ruficaudatus* F. Cuvier : Indian Hare or Black-naped Hare.
 47. *Ocotona roylei roylei* Ogilby : Royle's Pike.

Order : Rodentia

Family : Sciuridae

48. *Funambulus pennanti* Wroughton : Northern Palm Squirrel.
 49. *Peturista petaurista albiventer* (Gray) : Large Red Flying Squirrel.

Family : Hystricidae

50. *Hystrix indica indica* Kerr : Indian Crested Porcupine.

Family : Muridae

51. *Alticola roylei* (Gray) : Royle's Vole.
 52. *Bandicota indica indica* (Bechstein) : Bondicoot Rat.
 53. *Golunda ellioti myothrix* (Hodgson) : The Indian Bush Rat.
 54. *Mus musculus homourus* Hydgson : The House Mouse.
 55. *Mus booduga booduga* (Gray) : Little Indian Field Mouse.
 56. *Nesokia indica indica* (Gray) : The short tailed Mole Rat.
 57. *Rattus rattus rufescens* (Gray) : Common Indian Rat.
 58. *Rattus nitidus nitidus* (Hodgson) : The Himalayan Rat.
 59. *Tatera indica indica* (Hardwicke) : Indian Garbil.
 60. *Vandeleuria oleracea rubida* Thomas : Indian Long-tailed Tree Mouse.

A stray female swamp-Deer was sighted in and around Dhikala 'Chaud' (Meadow), Corbett National Park in March, 1979.

Illicit Trade in Wildlife

R.K. THAKUR

Zoological Survey of India, Desert Regional Station, Jodhpur

Abstract

Wildlife has been exploited by man from the ancient times for food, pleasure, and profit from trade in Wildlife articles. But the present commercial exploitation have surpassed all the limits reducing the Wildlife population to such an extent after which extinction is the only possibility. Poaching, poisoning and then illegal exports are the various factors which have endangered many species that are on the Red Data Book of International Union for Conservation of Nature and Natural Resources (I.U.C.N.).

In this paper, a brief account of Wildlife legislation before the Wildlife (Protection) Act, 1972 came into force as well as salient features of the present Act have been given. Some facts experienced by the author as Wildlife Inspector in the Wildlife Regional Office (Department of Environment) at Calcutta and Bombay have also been incorporated. It will reveal some facts about Wildlife trade and leave scope for improvement in the present state of Wildlife conservation with respect to the export of Wildlife articles.

Trade in Wildlife

In India, trade in wildlife articles is a lucrative business especially in big cities like Delhi, Bombay, Calcutta and Madras. Hundreds of animals are slaughtered mercilessly every year and a number of articles are made out of them for export and sale in open market. Hand bags, Wallets, Purses, Vanity bags, Belts, Shoes, Attache cases, Portfolio bags of snake skins (mostly python, cobra, dhami, sand boa and water snakes), Lizard skins (*Varanus* spp.), Crocodile skin, Fur coats of various animals and Ivory articles are the biggest attraction for the foreign tourists. All these animals from which the above mentioned articles are made, have been completely protected under the Wildlife (Protection) Act, 1972.

Animals More Prone to Poaching

(1) *Rhinoceros* : The great Indian rhinoceros is highly desired because its horn is believed to possess medicinal powers. In times past the creatures roamed the entire Ganges Basin, then they were slaughtered until only a few dozen animals remained. Today about 700 are protected in Kaziranga National Park in Assam.

(2) *Elephants* : This great animal is more susceptible to poaching for their tusks. Ivory is commercially exploited for making costume jewellery and statues. The export Indian Ivory is completely banned but still it faces extinction by the poachers.

(3) *Bear* : Bear bile is of high medicinal value due to which Himalayan black, brown and sloth bear are slaughtered. Till recently there has been so many cases when the bear bile was being smuggled out through Delhi and Bombay airports but the consignments were caught by customs.

(4) *Himalayan Musk Deer* : This animal has been hunted for the sake of musk, it is yet another species on the brink of extinction, at least within Indian region.

(5) *Snakes, Lizards (Varanus), Crocodile* : The skins of snakes (especially python, cobra, water snakes, dhami and sand boa), lizard (*Varanus* spp.), crocodile skins are of high commercial value and are used for making ladies bags, purses, shoes, belts, portfolio bags, small suitcases, bangle boxes etc. Madras is the biggest centre in our country which is the main source of these products. All the smuggling starts from this place only, and are smuggled out through Calcutta, Bombay and Delhi. All these species fall under part 'A' of Schedule 1 of the Wildlife (Protection) Act, 1972 and are completely banned for export.

(6) *Animals whose fur is of high commercial value* : Though almost all the species whose skin is used for making fur coats, stoles, shoes, hand gloves, caps have been banned under the Wildlife Act, but still certain animals such as foxes, cheetal, sambhar, jungle cat etc. are hunted by the poachers for their valuable skins. Apart from their valuable skins, sambhar and cheetal are killed for their tasty meat.

(7) *Peacock* : In South India, peacock was slaughtered by the tribals for making oil which is said to be of some medicinal value. Wildlife Office, Madras has been quite successful in stopping this cruel act. But still in other parts of the country there are occasions, when this animal is killed for its tasty meat.

Smuggling of Wildlife Articles

At times we read in the newspapers about the smuggling of Wildlife articles. Wildlife wing of Forest Department and especially, Customs have unearthed many gangs of smugglers dealing in wildlife articles. As a Wildlife Inspector I got the opportunity to identify such seized goods in the Customs godowns. Apart from this major act of smuggling, I am giving some other means of smuggling experienced during my stay in Wildlife office in Bombay.

(i) *Smuggling as passenger baggage* : I have come across a number of cases when wildlife articles have been found in the passenger baggages. Ivory articles, bags of snake skins and lizard skins, fur coats and sometimes tanned skins have been caught by customs and referred to us for identification.

(ii) *Smuggling through foreign post office* : The foreign tourists buy the valuable wildlife articles and despatch them by post parcels. While checking Ivory consignments in foreign post office, I have come across numerous such cases caught by customs. This is adopted as a main method of smuggling of Tiger, Leopard, Cheetal, Sambhar, Nilgai, Snake skins, Lizard (*Varanus* spp.) skins.

(iii) *Smuggling as garments* : False declaration is one of the key methods by which fur coats and other articles are exported. This is the most common method among the illegal exporters when these articles are declared as garments but the consignment contains wildlife articles. Such consignments are usually very big and all the cases contain garments except few in which these wildlife articles are packed.

(iv) *Snake skin and Varanus skin articles as leather articles* : So many cases have been caught when purses, bags, suitcases, vanity bags made out of snake skins, *Varanus* and Crocodile skins are smuggled out as leather goods. It is to be pointed out that custom officers are not technical experts of wildlife, and so there has been instances when such consignments have gone out of their hands. This is one of the reasons that wildlife offices were opened in 4 major cities and Wildlife Inspectors were appointed (on deputation) from Zoological Survey of India as technical experts. Since then all these consignments are referred to wildlife office for their 'No objection' before final clearance.

(v) *Duty free shops in the transit lounge of Santa Cruz Airport* : This is the shopping arcade which is exempted from customs scrutiny. In past, large quantities of wildlife articles and ivory articles were being sold freely without any implementation of Wildlife (Protection) Act, 1972. At present it is being tackled by the wildlife office, Bombay.

(vi) *Smuggling of Ivory articles as bone articles or inlaid plastic articles* : The export of handicraft and costume jewellery made out of camel and buffalo bones, and boxes, tables inlaid with white plastic is a big business in Bombay. But at the same time, we have caught certain cases when ivory articles were being exported, declared as bone or plastic articles. The consignments were disallowed and culprits were heavily fined for cheating and illegal act of smuggling.

Wildlife Conservation Before—1972

The history reveals that there has been attempts in the past to curb the human instinct to hunt and an urge to exploit wildlife. Ranjitsingh (1975), the first Director of Wildlife Preservation, New Delhi has given a good account of Wildlife conservation in ancient times as well as the present laws. Going back to the history, perhaps Emperor Ashoka was the first who thought of conservation and restricted the slaughter of animals. From then onwards

till recently, there has been an evolution of rules, laws and acts, contributing to the preservation of wildlife according to the need of the time. In the past there has been varying changes in the laws effected from time to time.

Before 1972, all the states in India were having their own laws and Acts according to their present fauna and needs; but there was no uniformity of rules throughout the country. A need had long been felt to have comprehensive legislation on wildlife which could cover all the aspects such as :

- (i) Creation and conservation of sanctuaries and National Parks,
- (ii) Control of wildlife trade and taxidermy,
- (iii) Reserved and protected forests,
- (iv) Controlled hunting under licence,
- (v) Prevent poaching and all illegal aspects, and
- (vi) Wildlife management.

To sum up of these aspects, a policy was framed by wildlife experts which was finally shaped into Wildlife (Protection) Act, 1972 duly enacted by Parliament (No. 53 of 1972 vide clause (1) of article 252 of the Constitution, 9th September, 1972). The Wildlife (Protection) Act, 1972 covers much more ground than its predecessors and is quite effective provided it is implemented in all states quite effectively without any fear, favour and our socio-political pressures.

Wildlife (Protection) Act, 1972 : Salient features

(i) Under the Wildlife Act, four regional offices in Delhi, Bombay, Madras and Calcutta have been opened under the department of Wildlife Preservation (Department of Environment) headed by a Director assisted by Deputy Directors and Wildlife Inspectors at the regional offices (vide sections 3 and 5 of the Wildlife Act.). After commencement of these regional offices, illegal trade in the 4 major cities and other parts of the country which are more responsible for the drainage of wildlife and its articles, is quiet under control. At present, all the export of wildlife from Airports and Sea Ports (Delhi, Bombay, Calcutta and Madras) is being allowed only after getting 'No objection' certificate from the wildlife office. The 'No objection' is being issued only after thorough checking, taking care of all the legal aspects.

(ii) In all the states, the forest department has now a separate wildlife wing headed by a Chief Wildlife Warden and assisted by other officers and employees (Section 4).

(iii) Wildlife Advisory Boards have been constituted which meet twice a year where day to day problems for wildlife preservation are discussed and recommendations are made

to the State Government for effecting necessary changes or arrangements as the case may be (vide section 6, 7 and 8).

(vi) Necessary rules for hunting of wild animals have been made (vide sections 9 to 17). According to the Act, no person shall hunt wild animals listed in schedule I (vide section 9; but section (i) except as mentioned in section 11 of the Act. No person shall hunt wild animals listed in schedules II, III and IV without a valid licence (vide section 9, sub sections 2 to 6). Every licensee has to maintain a record of animals (other than vermin) killed or captured by during the tenure of the licence (section 10).

(v) Creation, conservation and management of wildlife sanctuaries and parks is organised by the State Government (sections 18 to 38). Declaration of 'Game reserves' and 'closed areas' is effected by the State Government by notification (sections 36 and 37).

(vi) Trade in wild animals and animal articles and trophies is being regularised as per rules dealt in chapter V of the Wildlife Act (sections 39-49). The export of specified wild animals and their articles as per Annual Export Policy (CUSTOMS, Min. of Finance) is allowed only under a valid licence and necessary documents such as 'Legal Procurement Certificate' (for export stag horns, birds, animals, skins etc.) issued by the Chief Wildlife Warden or any other authorised forest officer. In case of exports of articles made of African Ivory (Indian Ivory being completely banned), the exporter has to produce the 'Re-export Certificate' (in case of new ivory) or 'Exemption Certificate' (Old Ivory imported into India before 4 February, 1974) issued by the management authority in India.

Rules indicating the procedure and guidance for the grant, renewal, suspension, and cancellation of licences have been dealt under the sections 44, 45, 46 and of the Wildlife Act. According to the Act, all the dealers were advised to declare their stocks to the Chief Wildlife Warden or the authorised forest officer within 30 days of the commencement of the Act in that state (sections 40, 41, 42). They are required to submit monthly returns to the Chief Wildlife Warden or authorised forest officer (a carbon copy to be submitted to Deputy Director, Wildlife office) showing their transactions. The stock in hand is verified from time to time by the above said officers and their authorised staff (section 47).

(vii) Under the Act, Director of Wildlife Preservation and his subordinate staff (Deputy Directors and Wildlife Inspectors) or the Chief Wildlife Warden and his authorised staff have been given sufficient powers vide section 50 to take action against the persons violating the Act.

Some Tips from Wildlife Trade

Though the Wildlife Act has been framed with great care, considering all the important aspects towards conservation of our wildlife, still there are certain lacunae which

are needed to be filled. A few suggestions are brought forward below for the improvement of our effort in the preservation of Wildlife.

(i) Under the Wildlife Act, export of articles made of all the snake skins are banned but there is a provision that the trade in these articles can be carried on (except made of Python skin, within the country by obtaining a Dealership licence from the Chief Wildlife Warden or an authorised officer. There are a number of shops in Bombay, Delhi and even the Govt. Handicraft Emporium are selling such articles. The fact can not be denied that these articles are a great attraction for foreign tourists and these are hardly purchased by Indians. Even if the tourists buy these articles in small quantities and collectively taking into consideration of the tourists visiting India, it is as good as an export.

(ii) It is a matter of great concern that most of the exporters of birds, export birds at very low prices in competition to each other to get the heavy orders from foreign buyers. Their only aim is to earn money and never care as to how they are playing havoc with our wildlife. Their prices are less in comparison to their counterparts in other countries. I wish, under the Wildlife Act special instructions regarding standard prices for birds or other animals or their articles meant for export may be issued.

(iii) For carrying trade in wildlife, a dealership licence is necessary (vide section 44, sub-section C4 of the Wildlife (Protection) Act, 1972 (at present no new licence is being issued) and on this licence it is clearly mentioned 'Non transferable'. But there are cases where the original party has sold the licence to other person.

iv) The exporters of birds and stag horns have to get a health certificate testifying the good health of birds or other animals and also a veterinary certificate for stag horns from an authorised Doctor before the final export. The birds or the animals meant for export are highly ill fed, very weak in health; the shed horns are found to be infected with insects.

v) Export of articles made of Indian Ivory is completely banned but of African Ivory is permitted under CITES (Convention on International Trade in Endangered Species). The export is allowed under Exemption Certificate (for the articles of old Ivory imported into India before 4 February, 1977) or Re-export certificate (for new Ivory) issued by the management authority in India under CITES. The common methods of differentiating between Indian or African Ivory are (i) by section cutting and examining the grains under the microscope (ii) by calculating the specific gravity of their specimens, (iii) Indian Ivory is coarse grained whereas African Ivory is fine grained. Though the first two methods are scientific and third one is the only physical method but still none of the above methods is practically possible at the time of examination of the Ivory consignments. Only by thorough scrutinizing of the records, right from importing the raw ivory to the export of finished articles, these consignments are allowed.

I feel with my experience as a Wildlife Inspector that there may be some scope for the exporters to exploit the present laws and there are chances that Indian Ivory also might be going within those exports. It can be further supported with the plea that there are auctions of Indian Ivory at times (recently a large amount of Indian ivory was auctioned at Madras). Considering the fact that the home consumption is not much, then where this all ivory goes ?

vi) The export of peacock tail feathers is already controlled by quota system, and there is no need of licence to deal in raw feathers vide section 44, sub-section (i) (b) of Wildlife Act, 1972. At the same time, raw feathers are not allowed for export and only finished articles are permitted. But for exporting finished articles, licence is necessary. The whole law looks quite confusing and needs clarification. I strongly feel that this export of peacock tail feathers whether raw or finished articles, should be allowed only strictly under licence. I am sure it will add to more strict conservation of the national bird.

Acknowledgements

I express grateful thanks to the Director, Zoological Survey of India, Calcutta for facilities and encouragement; to Dr. T.D. Soota, Ex-Deputy Director, Desert Regional Station, Zoological Survey of India, Jodhpur for kindly going through the manuscript and offering useful suggestions.

References

1. Singh, R. 1975. Wildlife and legal protection. *Cheetal*, Dehra Dun, 16 (4) : 3-8.
 2. Wildlife (Protection) Act, 1972 (Govt. of India Press, New Delhi).
-

All India Jeeva Raksha Bishnoi Sabha

By

AIR CMDE. R.S. BISHNOI, A.V.S.M. (RETD.)

Many of us nature lovers may not be aware of the existence of an organisation engaged in conservation, which though seemingly small is intrinsically big, which though located in a small town has an all north-Indian character and which though sectarian in name is entirely secular in outlook. This organisation is All India Jeeva Raksha Bishnoi Sabha. Its head office is located at Abohar¹ in District Ferozepur in Punjab. Abohar is a small town, not even the headquarters of a revenue sub-division. While the name of the organisation implies that it is an association of Bishnois only, its membership is open to any one irrespective of caste or creed, if he or she is a vegetarian and subscribes to the aims of the organisation. The main aims of the organisation are:

- (a) To develop a culture of loving all living beings. Green trees are considered as living beings according to the ethos of Bishnoi way of life.
- (b) To protect wild animals, amphibians and birds, and make arrangements for their treatment, where necessary.
- (c) To make efforts to have the cow (and its progeny) declared as the national animal, keeping in view that India is predominantly an agricultural country.
- (d) To make efforts to have hunting prohibited within boundaries of such villages in which vegetarians constitute a majority.

As for the reason for the inclusion of the word 'Bishnoi' in the name of the organisation it is because of the extreme importance given to the sanctity of all life in the Bishnoi religion, and also to draw inspiration from the sacrifices made by the Bishnois in the past for protection of green trees and wildlife. It is a fact of history that 363 Bishnoi men, women and children sacrificed their lives in the world's largest ever non-violent agitation for the protection of green trees. This was at Khejadli, a village 21 kilometres due north-east of Jodhpur in the year 1731. There have been a number of cases before that incident and after it, including in the recent past, where Bishnois have defended wild life even at the cost their own lives. This gives the rationale for including the word 'Bishnoi'.

The organisation first came into existence under the title 'Shikar Nirodhak Committee' (i.e. Ant Hunting Committee) in 1966. In 1973, its name was changed to what is at

1. Postal address: Street No. 13, ABOHAR (Pin 152116), Punjab.

present, so as to give it a positive name rather with an 'anti' facet. On January 15, 1975, it was registered by the Punjab Government.

All these years the organisation has been active in pursuing cases of illegal shikar in courts of law, rendering financial assistance to the families of those who get killed while trying to resist poachers, and mobilising public opinion in favour of compassion to wild animals. It is important to note that a lot of difficulty is experienced in successfully prosecuting cases of illegal hunting in courts of law. It is a known fact that shikaris generally belong to the affluent or/and aggressive class of people. Those giving evidence against them are subjected to a lot of intimidation and threats. Sometimes even false cases are launched against the witnesses so as to pressurise them. Unless the illegal shikaris can be brought to book, all the laws enacted by the legislatures will remain on statute book without serving their purpose. It is to the credit of this organisation that they have pursued the cases with doggedness and tenacity which has become characteristic of them. In this respect the role of its founder president Shri Sant Kumar Rahar is indeed commendable, who though in his sixties, is virtually a human dynamo, ever willing to move at no notice wherever there may be any flagrant violation of conservation-laws.

On April 8, 1978, three hunters of a town Fatehabad in District Hissar (Haryana) shot at a gazelle in village Muthan. The gazelle got injured, and while trying to escape the tyrants, came into the field of Shri Kehar Singh and fell down. While trying to save the animal, Shri Kehar Singh, a non-Bishnoi, became a victim of the shikari's bullet, and died. The All-India Jeeva Raksha Bishnoi Sabha rendered financial assistance to the bereaved family, and organised a big public meeting to offer their condolences and mobilise public opinion against shikar.

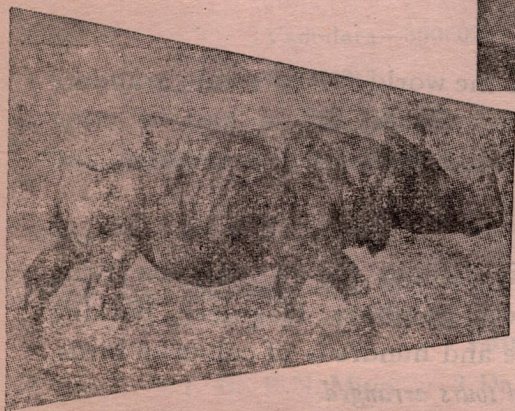
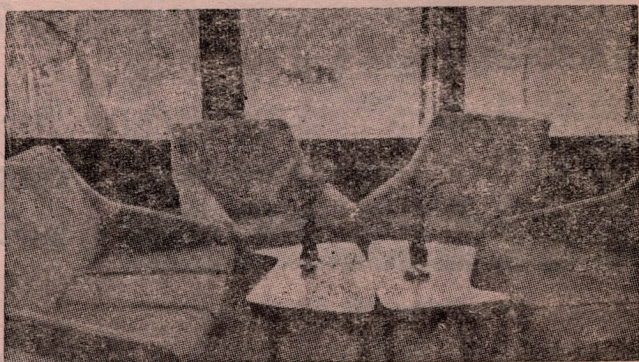
Some of the readers may recall that a 23 year old young man Shri Hari Narayan Bajpai (not a Bishnoi) of Kanpur self-immolated on May 11, 1983 on the bank of river sangur, as his 15-day notice to the Government to ban all hunting of blue bull (neel gai) had remained unheeded. This happened in district Kanpur and its news appeared in a language paper in Abohar on May 15, 1983. The A.I. Jeeva Raksha Bishnoi Sabha immediately jumped into action. They got 32 copies of the news item made out, and sent it to various governments and dignitaries, demanding that the sacrifice made by the young Hari did not go in vain, and if the ban on blue bull's killing was not ordered within thirty days, there would be one 'Hari' (i.e. a member of the Sabha) immolating himself at the same spot where Hari N. Bajpai laid down his life. Before the expiry of the notice period, a ban on hunting of all animals was ordered. The A.I. Jeeva Raksha Bishnoi Sabha has since got a memorial constructed at the martyr's village, and also held its annual meeting at the hallowed village.

The Organisation publicly honours eminent conservationists. Two such persons are Shri Mir Inayatullah and Shri Kailash Sankhla, former Chief Wildlife Wardens of J & K and Rajasthan respectively. Compilation of the list of 363 martyrs who sacrificed their lives in the cause of green trees referred to earlier, has been possible due to the efforts of this organisation, as traditional records maintained by Raos, the family chroniclers, of about 100 villages dating back to 250 years had to be gone through by the present holders of those registers, and it was a laborious process.

The organisation has now its branches in Punjab, Haryana, Rajasthan, Delhi, Uttar Pradesh and Madhya Pradesh. One of the activities of the organisation in Abohar area is to sit in ambush in cold nights to surprise the poachers, should they come out for illegal shikar. Such an enthusiasm pre-empts poaching, and acts as a deterrent. "Live and let live" is the motto of the organisation, and the path they follow is tortuous, but self-rewarding.

Have a drawing-room view of wild animals

VISIT



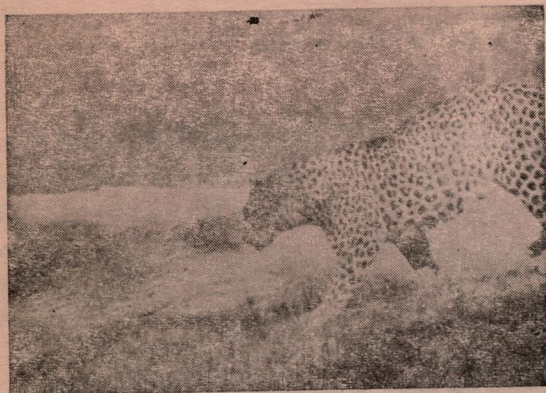
**JALDAPARA
WILD LIFE
Sanctuary**

- *Home of One-horned rhinoceros.
- *Gaur, elephants, tigers.
- *Varieties of deer and other animals.
- *Furnished Tourist Lodges with full catering arrangement.
- *Approachable by Road, Train and Air.
- *Jeep available.

Please contact :—

**DIVISIONAL FOREST OFFICER
COOCH BEHAR
(Phone C.B. 247)
WEST BENGAL
OR**

**FOREST UTILISATION OFFICER
8, Lyons Range, CALCUTTA
(Phone 22-2774)
WEST BENGAL**



Uttar Pradesh's
Twin Attractions

FOR LOVERS OF WILDLIFE
CORBETT NATIONAL PARK
DUDWA NATIONAL PARK

Corbett National Park is famous all over the world for its scenic grandure and its wildlife—elephant, tiger, deer (several species) and a host of other mammals, birds and reptiles—the Ghariyal and snubnosed crocodiles and the mighty “Mahasheer” fish.

DUDWA Sanctuary, now National Park, is famous for its only surviving herd of 2000 Swamp deer, Tiger, Spotted deer, Sambhar, Hog deer, Barking deer, Sloth bear, Wild boar, Marsh crocodile and hundreds of colourful birds. It is a paradise for bird watchers. *Conducted tours arranged.*

All Amenities Provided.

Write to :—

CONSERVATOR OF FORESTS

Wildlife Preservation Organisation

17, Rana Pratap Marg,

LUCKNOW

Tel : Wildlife :: Phone : 26140



President:— Col. Pratap Singh Malvendra
of Nabha
6, Panchsheel Marg,
New Delhi

Delhi Branch

President:—Shri K.P. Singhdeo
Minister of State for
Personnel and Administrative
Reform,
Government of India,
New Delhi

Vice President.— M.A. Rashid
103, Ketan Apartment
Fatehganj Camp

Exe. Vice President:— Shri S.K. Roy
90-B, Defence Colony,
New Delhi

Vadodara— 390002
(Gujarat)

Bihar ranch (Monghyr)

President—Kumar Surindra Singh
Tal Kothi, Gidhaur

Hony. Secretary:—Dr. R.N. Misra

Treasurer:—Dr. S. K. Sangal

Hony. Asstt. Secretary:—Shri N.K. Gaur

Editorial Board

1. Dr. R.N. Misra 2 Dr S.K. Sangal 3. Shri N.K. Jain

Buy from the Hony. Secretary, Wildlife reservation Society of India 7, Astley Hall, Dehra Dun.

	Price
(1) Society's Badge—Metal Cheetal Head	... Rs. 6.00 each
(2) Balance of Nature Game (Postage extra)	... 12.00 „
(3) 'National Parks' by K.S. Sankhala, IFS (Published by WLPSI) (Post free)	... 15.00 „
(4) CHEETAL—IUCN Special Souvenir Issue, 1969	... 15.00 „
(5) „ „ „ „ „ 1972	... 12.00 „
(6) Back Numbers of Cheetal	... 10.00 „

Edited by Dr. R.N. Misra, Dr. S.K. Sangal, N.K. Jain and Published by Dr. R.N. Misra, Hony. Secretary
Wildlife Preservation Society of India (Phone: 25392), 7, Astley Hall, Dehra Dun and
Printed by T.C. Sharma at Dun Printing House, Rajpur Road, Dehra Dun.